

SPECIFICATIONS/規格

Fuselage Length/機身全長	45.27" (1150mm)
Fuselage Width/寬度	5.51" (140mm)
Total Height/高度	15.75" (400mm)
Main Rotor Dia./主旋翼直徑	49.00" (1245mm)
Tail Rotor Dia./尾旋翼直徑	10.25" (260mm)
Gear Ratio/齒輪比	1:9.56:4.57
Full Equipped Weight/全配重量	6.6 lbs (3000g)



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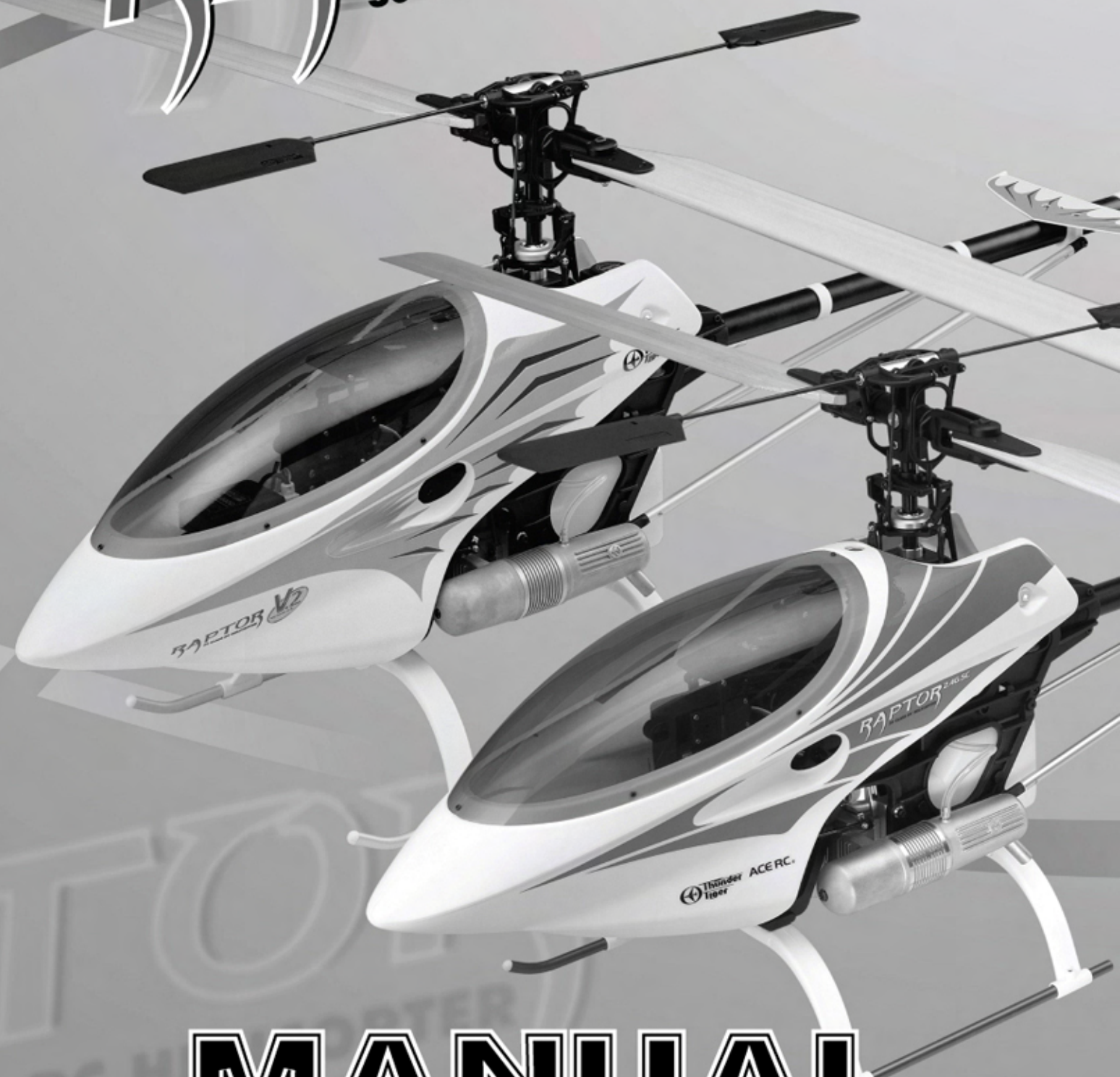
JK0094 V5



RAPTOR

30 CLASS RC HELICOPTER

V2
Version 2.0



MANUAL

30級直昇機組裝說明書

ASSEMBLY & MAINTENANCE

INTRODUCTION 前言

Congratulations on your purchase of the Raptor 30 V2 helicopter. It is the most popular 30-size helicopter in the world. The Raptor 30 has helped beginners master the art of RC helicopter flying. The Raptor 30 has helped experienced pilots learn new 3-D maneuvers. This is truly a versatile model helicopter for everyone. We did not just sit on our laurel, our team of engineers and test pilots have collected feedbacks from around the world and have now made the Raptor 30 an even better helicopter. We made new molds and tooling for new parts. Many areas have subtle changes to increase strength and durability.

Together, the new Raptor 30 V2 and the PRO 39H(R) engine will provide you with many hours of enjoyment. Thank you again for purchasing our fine products.

感謝您選購雷虎科技翼手龍30 V2版本直昇機，翼手龍30 V2是市售其他同級3D直昇機中的最佳選擇！此款版本是雷虎科技研發團隊根據翼手龍30 V2版本再次進化而成的創新產品，優異性能使飛行動作更加乾淨俐落，能充份實現飛行愛好者所有夢寐以求的特技動作。強烈建議您，請務必詳細閱讀本說明書後，再開始進行組裝及使用本產品，閱讀完畢後請您妥善保存本說明書以為往後直昇機進行調整或維修時使用。

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WARNING 警告事項

This radio controlled helicopter is not a toy. It is a sophisticated piece of equipment and is designed for hobby use only. If not properly assembled and operated, it is capable of causing property damage and bodily harm to both the operator and/or spectators. Thunder Tiger and its duly authorized distributors assume no liability for damage that could occur from the assembly and/or use/misuse of this product.

1. 本產品非玩具且具有相當程度的危險性，不當的組裝、調整或操控皆會導致自己或他人身體嚴重的傷害。當上述原因造成傷害事件時，製造商是得以免除責任的。因此請您在初次進行遙控直昇機飛行前，務必請教有經驗的飛行同好或銷售店家，以獲得最正確的組裝、調整資訊及飛行指導，以確保飛行安全。
2. 遙控模型使用的燃料具有相當高的揮發性以及低燃點的特質，當您於使用以及儲存時都必須相當注意使用燃油的相關規定：使用時必須遠離火源，儲存時必須放置在乾燥陰涼、遠離日照以及兒童不易取得的地方。
3. 模型引擎發動時所排放的廢氣可能會對身體產生相當程度的傷害，所以請避免於室內場所啟動引擎，並請在通風狀況良好的場所進行操作。
4. 遙控模型的儲放必須遠離高溫、日照、以及潮濕的場所，以避免機件損壞或是因而發生火災的危險。

AMA INFORMATION 遙控模型協會

Operating a model helicopter requires a high degree of diligence and skill. If you are a newcomer to the hobby, it is best to seek help and guidance from accomplished model helicopter pilots. This will greatly speed up the learning process and have you flying successfully in a reasonable time. We also would strongly urge you to join the Academy of Model Aeronautics. The AMA is a non-profit organization that provides its members with a liability insurance plan as well as monthly magazine entitled Model Aviation. All AMA charter aircraft clubs require all pilots to hold a current AMA sporting license prior to operation of their models at club fields. For further information, contact the AMA at:

Academy of Model Aeronautics 5151 East Memorial Drive Muncie, IN 47302 (317) 287-1256

操控遙控直昇機需要非常細膩的操作技巧，如果您是初次接觸遙控模型直昇機的初學者，建議您加入當地的遙控模型協會，或與您購買直昇機的店家一同進行飛行活動，以習得操作技巧、初級維修及調整的經驗，確保您的遙控模型運動順利安全進行。部分遙控模型協會亦提供了飛行場的飛行意外險，使您能安心暢快地飛行，並同時提供週遭的群眾最基本的安全保障。

FLIGHT SAFETY CHECKLIST 飛行安全檢查事項

- ⊙ Make sure both the transmitter and receiver batteries are fully charged prior to operating the helicopter.
- ⊙ Make sure all flight controls operate properly prior to flying.
- ⊙ Range check the radio before the first flight. The servos must operate properly with the transmitter antenna collapsed (or 2.4G radio system power reduction testing) at a range of at least 150 ft. (50 meters).
- ⊙ Check to make sure there is no radio interference on your radio frequency before operating the helicopter.
- ⊙ Use only the recommended engine fuel as specified by the engine manufacturer.
- ⊙ Make sure the transmitter and receiver are turned on before starting the engine.
- ⊙ The engine throttle must be in the idle position before starting the engine.
- ⊙ Model helicopter main and tail rotors operate at very high RPM. Make sure nothing can come in contact with the rotor blades during flight.
- ⊙ After starting the helicopter, maintain a safe distance during the flight.
- ⊙ Never operate the helicopter in rain or excessive wind conditions.
- ⊙ Always operate and fly your helicopter in a safe and responsible manner.
- ⊙ Never fly a model helicopter over other pilots, spectators, cars, or anything that could result in injury or property damage.
- ⊙ 每次飛行前確定您的接收以及發射機電池的電源是否能滿足飛行需求。
- ⊙ 每次飛行前確定直昇機的各項動作方向及行程是否正常。
- ⊙ 開機時必須遵守先開發射機後開接收機的順序，關機時需遵守先關接收機後關發射機的順序，並應養成習慣，時時遵守。不正確的開、關機，可能發生失控現象，造成自身以及他人身體的傷害。
- ⊙ 飛行前需確認是否有相同頻率的同好進行飛行，相同頻率的發射機一同開機將導致失控發生。
- ⊙ 請使用引擎製造商推薦的燃油。
- ⊙ 每次飛行前需要檢查所有的連桿頭是否鬆脫，鬆脫的連桿頭將導致直昇機失控發生。
- ⊙ 啟動前需確認發射機電源開啓，接收機動作正常，以免發生引擎無法控制的危險。
- ⊙ 啟動引擎前必須詳細確認發射機的油門位置是否處於低速？熄火降落開關是否關閉？定速開關 (Idle) 是否關閉？啟動時將油門處於高速位置將對自身產生危險。
- ⊙ 主旋翼與尾旋翼動作時轉速相高，必須確認飛行時不會有接觸主/尾旋翼的情形發生。
- ⊙ 飛行時隨時注意與直昇機保持安全距離。
- ⊙ 避免於雨天、強風中飛行，以免發生無法控制的情形。
- ⊙ 作為一個稱職的遙控直昇機飛行員，必須要有安全的觀念與負責任的態度。
- ⊙ 飛行的高度必須遠離載人飛行器的高度與空域，同時必須避免接近車輛與圍觀的人員。

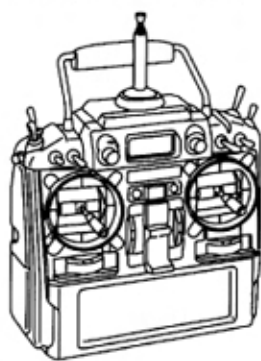
POST FLIGHT INSPECTION 飛行前檢查項目

- ⊙ Inspect the model thoroughly to insure no parts have come loose or become damaged during the flight and landing. Replace damaged parts and tighten loose screws before flying again.
- ⊙ Pump out any remaining fuel from the fuel tank.
- ⊙ Wipe off excess oil and fuel from helicopter body and other exposed parts.
- ⊙ Lubricate all moving parts to ensure smooth operation for the next time you fly.
- ⊙ Store model in a cool, dry place. Avoid storage in direct sunlight or near a source of heat.
- ⊙ Replace any loose ball links and damaged bearings.
- ⊙ 每次飛行前需要詳細的檢查是否有鬆脫或是損毀的零件，若有則必須立即終飛行，鎖緊鬆脫的零件以及更換損壞的零件。
- ⊙ 飛行後抽光燃油箱中的燃油。
- ⊙ 飛行後妥善的清潔機體上（所有外露部分）殘餘的燃油。
- ⊙ 為了下一飛行，請確認所有的可動零件均可順暢動作。
- ⊙ 儲存您的愛機在乾燥、陰涼、通風的地方，避免陽光直射以及遠離熱源。
- ⊙ 更換所有鬆脫球頭連及損壞軸承。

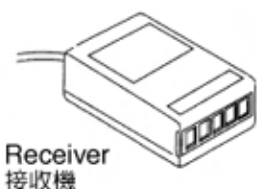
Following these few, simple safety rules will allow you to enjoy the thrill of model helicopter flying for many years to come.
遵從上面幾點簡單的安全規定，將使您能暢快的享受直昇機飛行的樂趣。

OTHER ITEMS REQUIRED 需自行準備的配件

RADIO SET / 遙控系統



Transmitter (helicopter type only, 6 or more channels)
發射機 (需具備直昇機控制功能的6動以上遙控器)



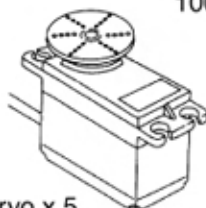
Receiver
接收機



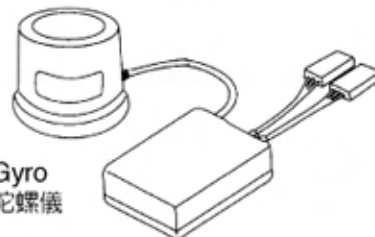
Battery 接收機電池
1000mAh



Switch Harness
具備充電線的開關組

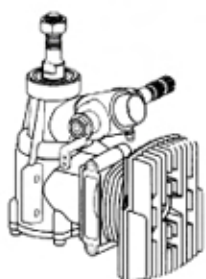


Servo x 5
伺服機x 5個
(部分陀螺儀會指定使用單一規格伺服機)



Gyro
陀螺儀

ENGINE / 引擎系統

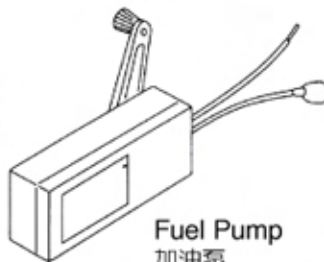


Glow Plug
專用火星塞

Heli Engine (32-39size)
直昇機專用引擎 (32-39size)

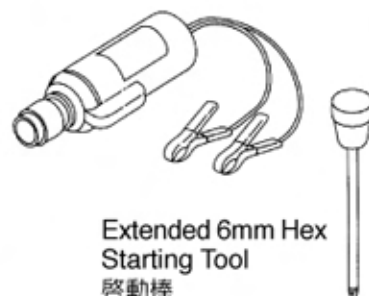


Glow Fuel(15%-30%)
直昇機專用燃油

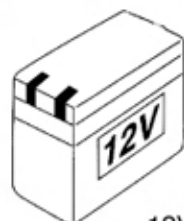


Fuel Pump
加油泵

12V Electric Starter
啟動馬達



Extended 6mm Hex
Starting Tool
啟動棒



12V Battery
電瓶

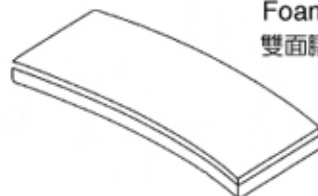
1.5V Glow Starter
(1.2V~1.5V)
1.5V快速電夾



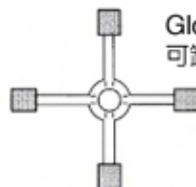
Rubber Band
橡皮筋



Foam
雙面膠帶



Glow Plug Wrench
可卸火星塞的十字套筒板手



Remote Glow Plug
Extension
火星塞外接線
(可視需求自行選擇)



Training Gear
直升練習架 (初學者必定要的配件)

TOOLS REQUIRED FOR ASSEMBLY 需要準備的工具

Needle Nose Pliers
尖嘴鉗



5.5mm Wrench
開口板手
7mm

Ball Link Pliers
拆連桿頭的
專用鉗子



Nipper
斜口鉗



Scissors
剪刀



Metric 4-way Wrench
十字套筒板手



Screw Driver
各種規格的螺絲起子



Instant Glue
螺絲防鬆膠



Blue Locktite
瞬間膠



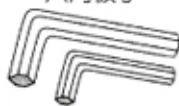
Grease
潤滑油



Epoxy
環氧樹脂

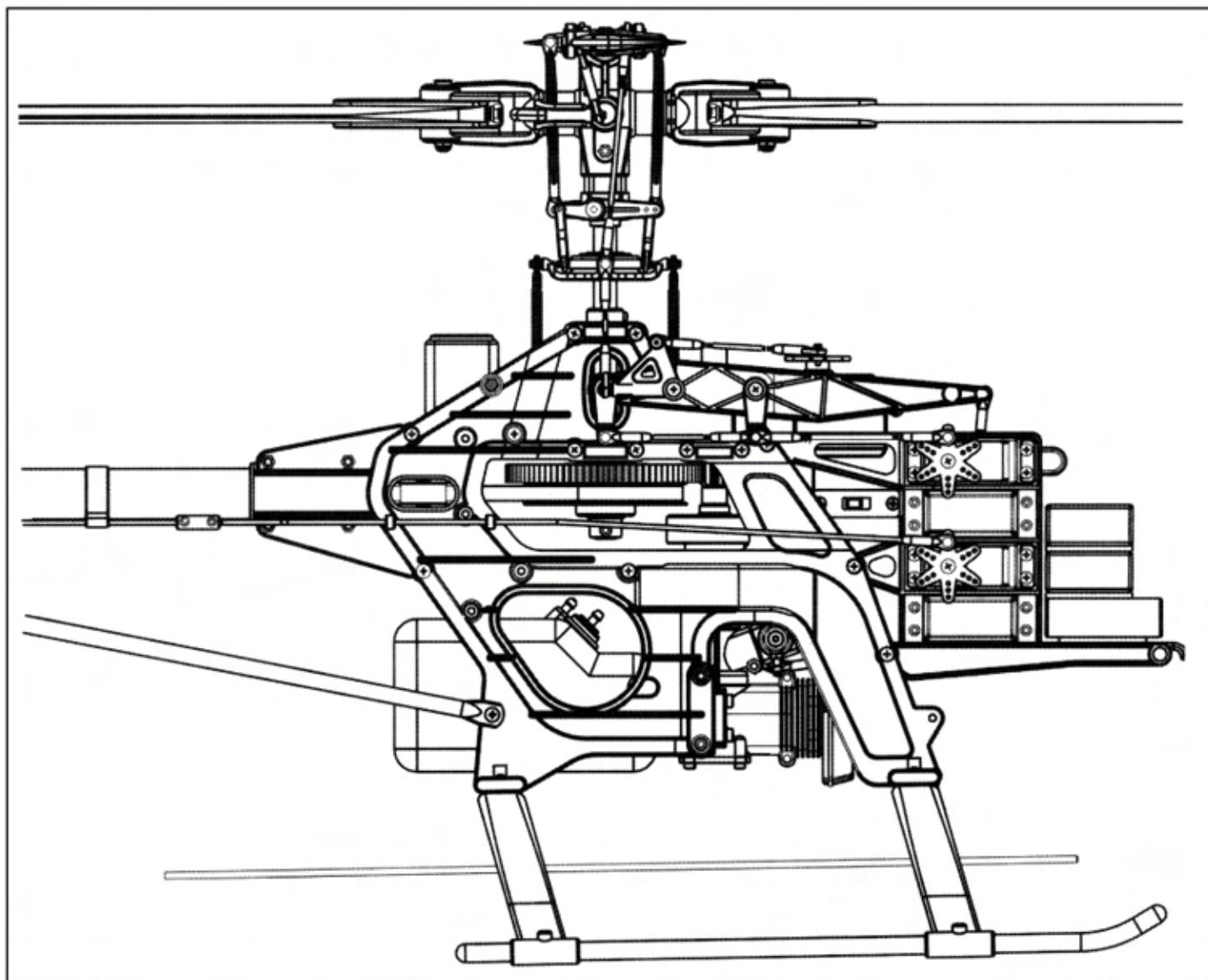


Hex Wrench
六角板手



Socket Drivers
套筒螺絲起子

ASSEMBLING SECTION 組裝程序



The parts in the Raptor kit are packed according to the assembly steps. The part number and quantity contained in each are always shown in the square box on each page. Do not open all the bags at once. Open only the bag that is needed for the current assembly step.

每一個零件包都是根據它的組裝步驟歸類包裝，請依照組裝順序開啓零件包，勿將零件包先行全部開啓，如此容易混淆所有的零件以及組裝步驟。

① Fuel Tank Assembly 油箱組裝步驟

Note 1 / 提示1

After assembly, check to make sure the fuel tank clunk can move from top to bottom without touching the back of tank. Also, a fuel filter (available from any hobby shop, 1164C/L) should be placed between the fuel tank and the carburetor.

油箱組裝完畢後，必須先確認油箱內油箱重錘能順暢的上下移動，但是也不能因為油管過長而接觸油箱後壁。

油管需確實安裝，並檢查油箱與油管間有無漏氣現象，建議您在油箱跟引擎之間安裝一個濾油器（例如產品編號1164C/L），以保持引擎使用燃油的清潔，避免阻塞。



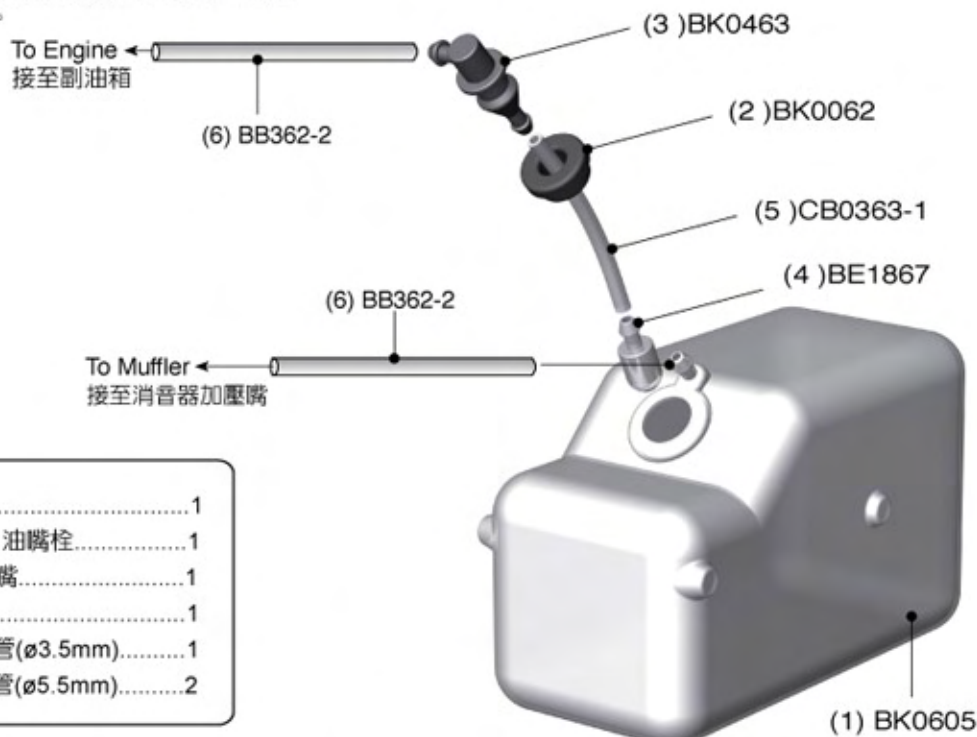
1164C/ L FUEL FILTER 油濾
(Not included 選購)

- | | |
|------------------------------------------|---|
| (1) BK0605 Fuel Tank 油箱..... | 1 |
| (2) BK0062 Fuel Tank Grommet 油嘴栓..... | 1 |
| (3) BK0463 Fuel Tank Nipple 油嘴..... | 1 |
| (4) BE1867 Clunk 油箱重錘..... | 1 |
| (5) CB0363-1 Fuel Tube 耐熱油管(ø3.5mm)..... | 1 |
| (6) BB0362-2 Fuel Tube 耐熱油管(ø5.5mm)..... | 2 |

Note 2 / 提示2

It might be necessary to inspect and replace the silicone tube inside the tank every month to ensure the fuel consumption is smooth.

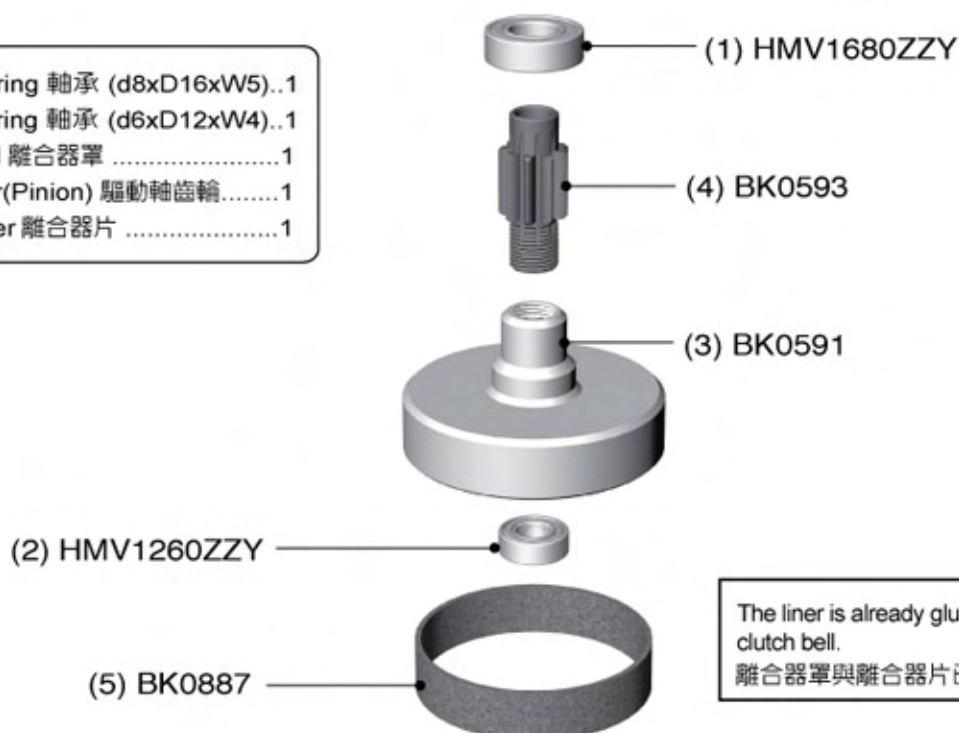
每月詳細檢查油箱內的小油管是否有損傷，以確保供油順暢。



② Clutch Bell Assembly 離合器組裝步驟

The fuel tank comes assembled already.
油箱已組裝完成

- (1) HMV1680ZZY Bearing 軸承 (d8xD16xW5)..1
(2) HMV1260ZZY Bearing 軸承 (d6xD12xW4)..1
(3) BK0591 Clutch Bell 離合器罩1
(4) BK0593 Drive Gear(Pinion) 驅動軸齒輪.....1
(5) BK0887 Clutch Liner 離合器片1



The liner is already glued in the clutch bell.
離合器罩與離合器片已完成黏合

③ Main Frame Assembly-Part1 主側板組裝步驟-1

Please insert the frame spacers, bearings, pulley and parts in the frames according to the drawing below. Install four metal aluminum frame spacers beside the main shaft bearings. Remember to add Loctite when securing these four spacers. Tighten the screws snugly, but do not over torque them which could strip the plastic.

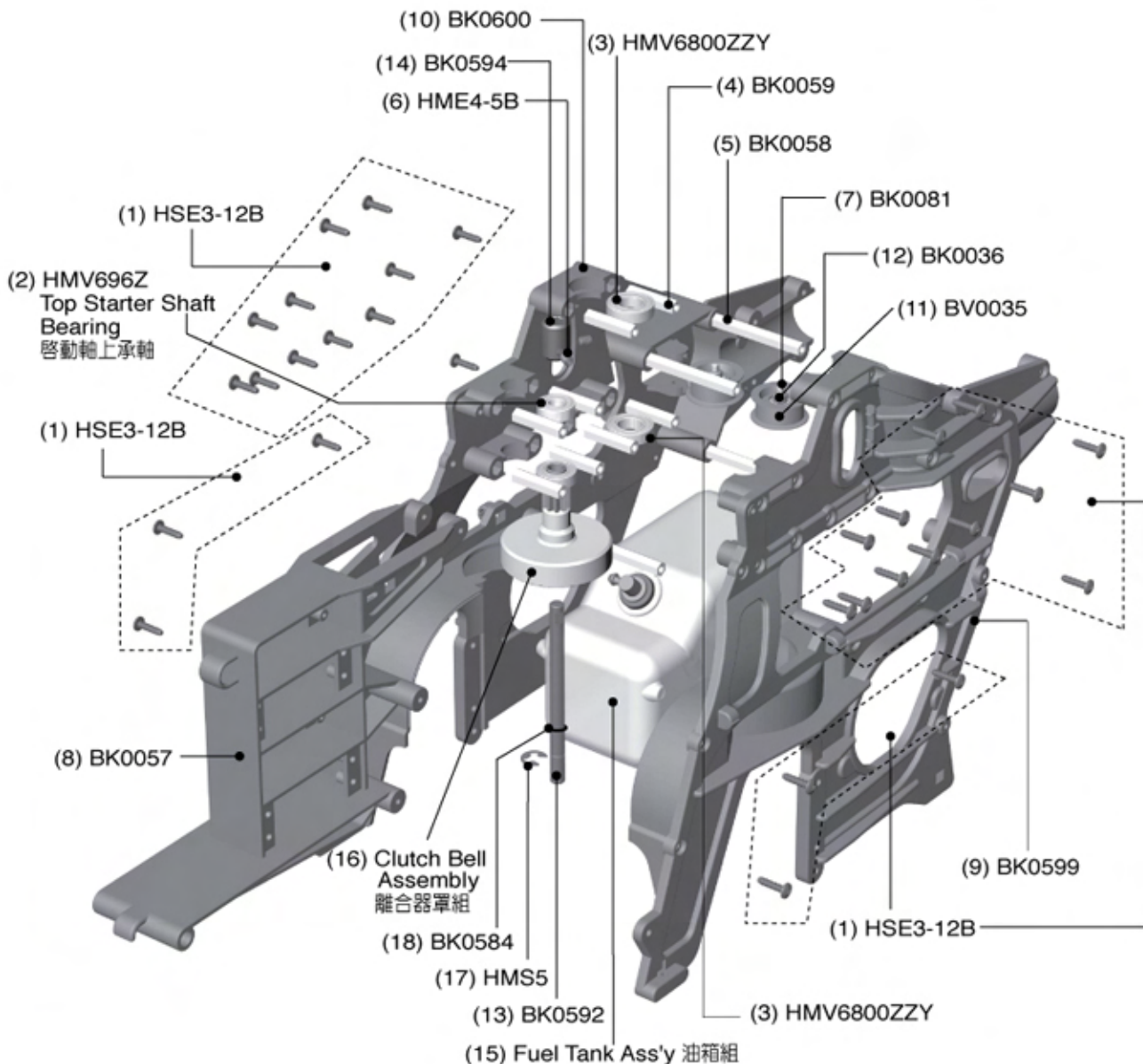
Insert starter shaft through the center of the clutch bell assembly, through the top starter shaft bearing and into the starter coupling. Secure it with the two set screws. Make sure this is tightly secured. The main frame can be reinforced with the recommended Aluminum Frame Post (PV0104).

組裝側板時，所使用的自攻牙螺絲必須確實鎖緊，但是也不能因此發生過度鎖緊而導致滑牙或斷裂現象。

啟動軸組裝時，需與啟動接頭確實鎖緊。

為加強側板強度，我們建議將塑膠側板支柱更換為金屬側板支柱（PV0104）

(1) HSE3-12B Self Tapping Screw 扁圓型自攻螺絲(M3x12).....	30	(10) BK0600 Main Frame Right Side 右側板.....	1
(2) HMV696ZZY Bearing 軸承(d6xD15xW5).....	1	(11) BV0035 Guide Pulley 主惰輪組.....	2
(3) HMV6800ZZY Bearing 軸承(d10xD19xW5).....	2	(12) BK0036 Pulley Collar 惰輪襯套.....	4
(4) BK0059 Frame Spacer 側板支柱(S).....	8	(13) BK0592 Starter Shaft 啟動軸.....	1
(5) BK0058 Frame Spacer 側板支柱(L).....	4	(14) BK0594 Starter Coupling 啟動接頭.....	1
(6) HME4-5B Set Screw 無頭內六角螺絲(M4x5).....	2	(15) Fuel Tank Assembly 油箱組.....	
(7) BK0081 Pin 固定銷.....	2	(16) Clutch Assembly 離合器罩組.....	
(8) BK0057 Servo Frame 伺服機座.....	1	(17) HMS5 E-CLIP E型扣環.....	1
(9) BK0599 Main Frame Left Side 左側板.....	1	(18) BK0584 Thrust Washer 止推墊片.....	1



④ Main Drive Gear Assembly 主齒輪組裝步驟

It is necessary to add grease inside the one way clutch before your first flight. The clutch might lock up once grease is gone. Oneway grease(PV0517) or ball differential grease is recommended for this lubrication.

單向離合器齒輪組裝入單向離合器組前，請先在單向離合器內抹上些許潤滑油，以防止單向離合器咬死，並增長單向離合器壽命。

建議使用廠所提供之單向專用潤滑油（PV0517）

- | | |
|----------------------------------------------|---|
| (1) HMC3-12B Socket Screw 內六角螺絲(M3x12)..... | 4 |
| (2) HMQ14 Snap Ring 軸用C型扣環..... | 2 |
| (3) BV0033 One Way Clutch Housing 單向離合組..... | 1 |
| (4) BK0031 Main Spur Gear 主齒輪..... | 1 |
| (5) BK0032 Tail Drive Pulley 尾驅動輪..... | 1 |
| (6) BK0034 One Way Clutch Shaft 單向離合器軸..... | 1 |

Add a drop of Blue Locktite on the thread of each of these four screws.

固定主齒輪與尾驅動輪時，螺絲必須上防鬆膠，並確實鎖緊。

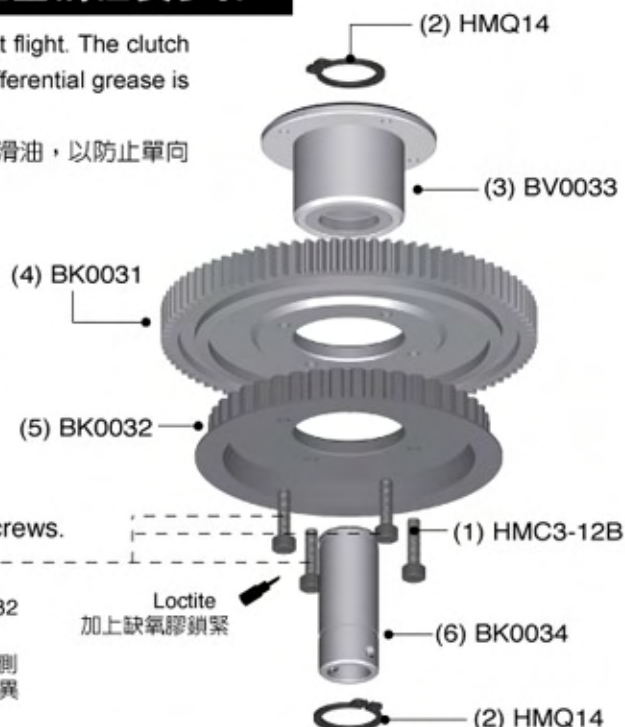


PV0517 ONEWAY GREASE
(Not included)

Add some light weight oil (PV0517) on BK0032 before inserting into BV0033.

BK0032 尾驅動輪(熄火降落組)組裝時請先在其內側抹上塑膠專用潤滑油(PV0517)、以防因磨擦發生異常變形或熔蝕現象。

Loctite
加上防鬆膠鎖緊

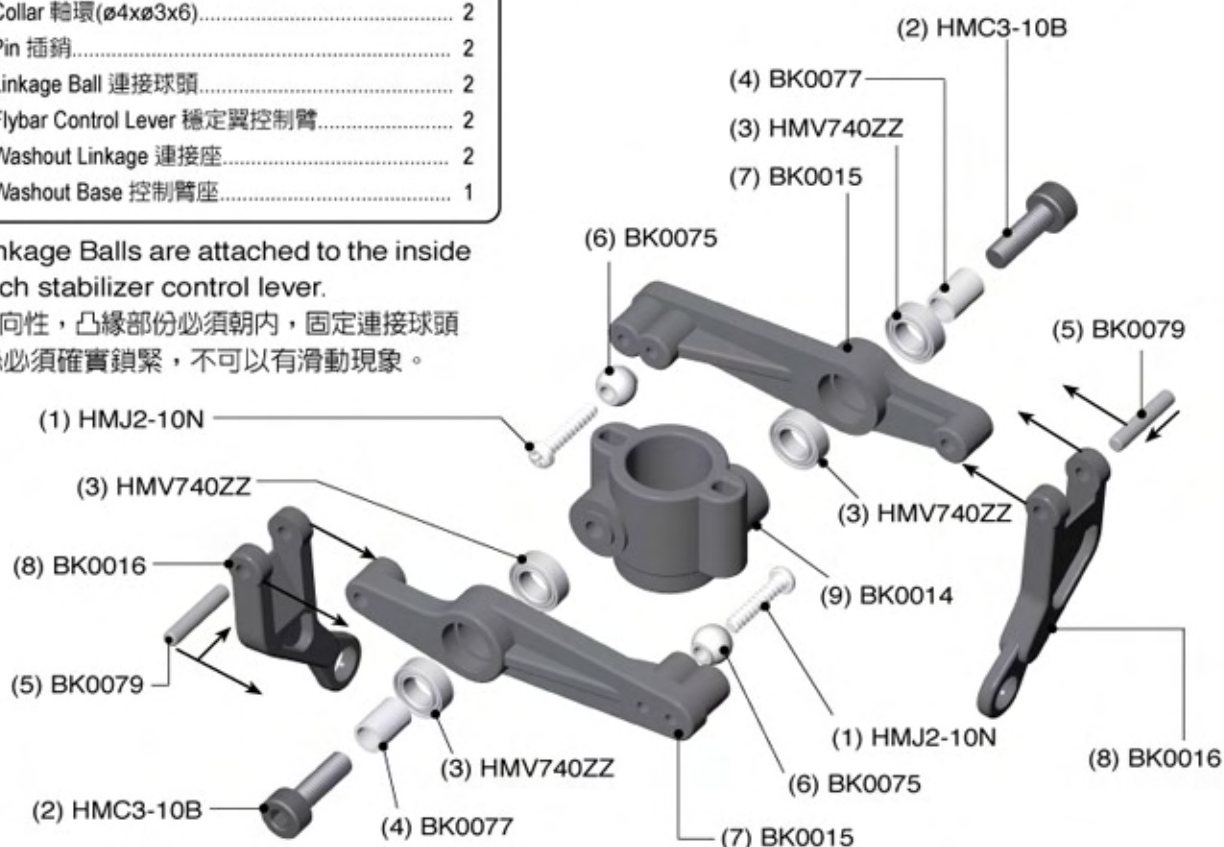


⑤ Washout Assembly 控制臂（下剪型臂）組組裝步驟

- | | |
|----------------------------------------------------|---|
| (1) HMJ2-10N Self Tapping Screw 圓頭自攻螺絲(M2x10)..... | 2 |
| (2) HMC3-10B Socket Screw 內六角螺絲(M3x10)..... | 2 |
| ※(3) HMV740ZZ Bearing 軸承(d4xD7xW2.5)..... | 4 |
| (4) BK0077 Collar 軸環(ø4xø3x6)..... | 2 |
| (5) BK0079 Pin 插銷..... | 2 |
| (6) BK0075 Linkage Ball 連接球頭..... | 2 |
| (7) BK0015 Flybar Control Lever 穩定翼控制臂..... | 2 |
| (8) BK0016 Washout Linkage 連接座..... | 2 |
| (9) BK0014 Washout Base 控制臂座..... | 1 |

Ensure Linkage Balls are attached to the inside hole of each stabilizer control lever.

連接頭有方向性，凸緣部份必須朝內，固定連接球頭的自攻螺絲必須確實鎖緊，不可以有滑動現象。



※ For sport kit (29BB) version, (Item No. 4839-K20/21) (3) will be replaced by Bushing(BK0107x4)

Sport 版本(4839-K20/21)，第三項零件HMV740ZZ 軸承由含油銅襯 (BK0107x4) 取代。

⑥ Main Frame Assembly-Part2 主側板組裝步驟-2

Add a drop of CA to the two screws at the pivoting point of the collective pitch control arm.

Attach the linkage rod to the parallel elevator linkage balls.

組裝攻角控制臂、側轉控制臂和升降舵雙推拉搖臂便於側板時，所使用的自攻牙螺絲可視需要使用螺絲防鬆膠，特別注意螺絲必須確實鎖緊，但也不能因此發生過度鎖緊，而致使發生滑牙現象。最後壓上連接桿檢查個部螺絲鎖的位置及方向性。

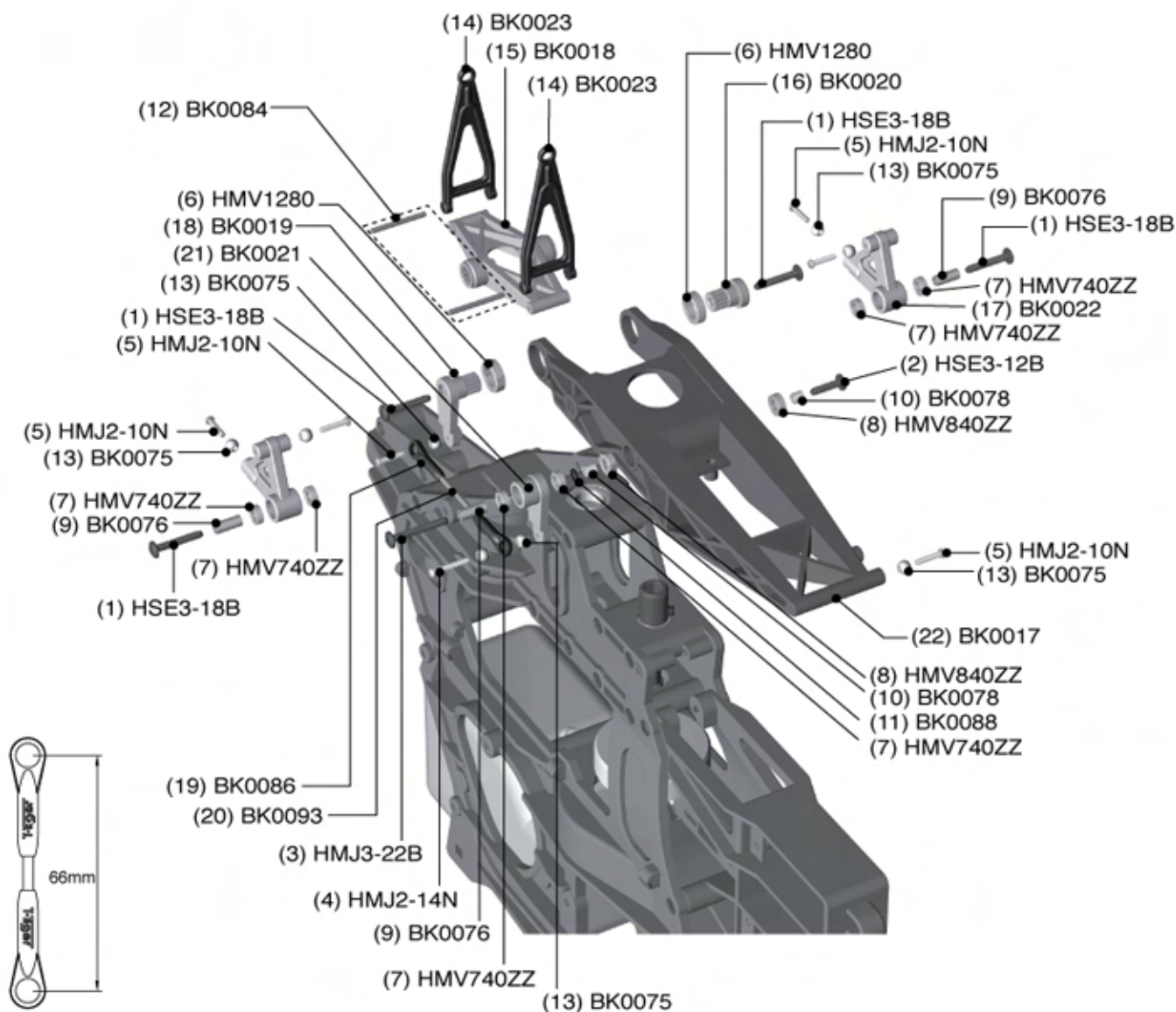
(1) HSE3-18B Self Tapping Screw 扁圓型自攻螺絲(M3x18).....4	(12) BK0084 Pin 固定銷.....2
(2) HSE3-12B Self Tapping Screw 扁圓型自攻螺絲(M3x12).....1	(13) BK0075 Linkage Ball 連接球頭.....8
(3) HMJ3-22B Self Tapping Screw 自攻螺絲(M3x22).....1	(14) BK0023 Elevator Control Arm Link 升降舵連接座.....2
(4) HMJ2-14N Self Tapping Screw 自攻螺絲(M2x14).....1	(15) BK0018 Elevator Control Arm 升降舵控制臂.....1
(5) HMJ2-10N Self Tapping Screw 自攻螺絲(M2x10).....6	(16) BK0020 Elevator Arm Control Shaft 升降舵固定軸.....1
(6) HMV1280 Bearing 軸承(d8xD12xW3.5).....2	(17) BK0022 Aileron Control Lever 側轉控制桿.....2
※(7) HMV740ZZ Bearing 軸承(d4xD7xW2.5).....6	(18) BK0019 Elevator Arm Parallel Lever 升降舵控制桿.....1
※(8) HMV840ZZ Bearing 軸承(d4xD8xW3).....2	(19) BK0086 Ball Link 單頭連接桿.....2
(9) BK0076 Collar 軸環(d3xD4x10).....3	(20) BK0093 Linkage Rod 連接桿.....1
(10) BK0078 Collar 軸環(d3xD4x4).....2	(21) BK0021 Elevator Control Lever 升降舵控制桿.....1
(11) BK0088 Flat Washer 墊片(d3xD5x0.5).....1	(22) BK0017 Collective Pitch Control Arm 攻角控制臂.....1

※ For sport kit (29BB) version, (Item No. 4839-K20/21)

(7) will be replaced by Bushing(BK0107x6) (8) will be replaced by Bushing(BK0108x2)

Sport 版本(4839-K20/21)，第七項零件HMV740ZZ 軸承由含油銅襯 (BK0107x6) 取代。

第八項零件HMV840ZZ 軸承由含油銅襯 (BK0108x2) 取代。



Warning, do not over-torque the self-tapping screws.

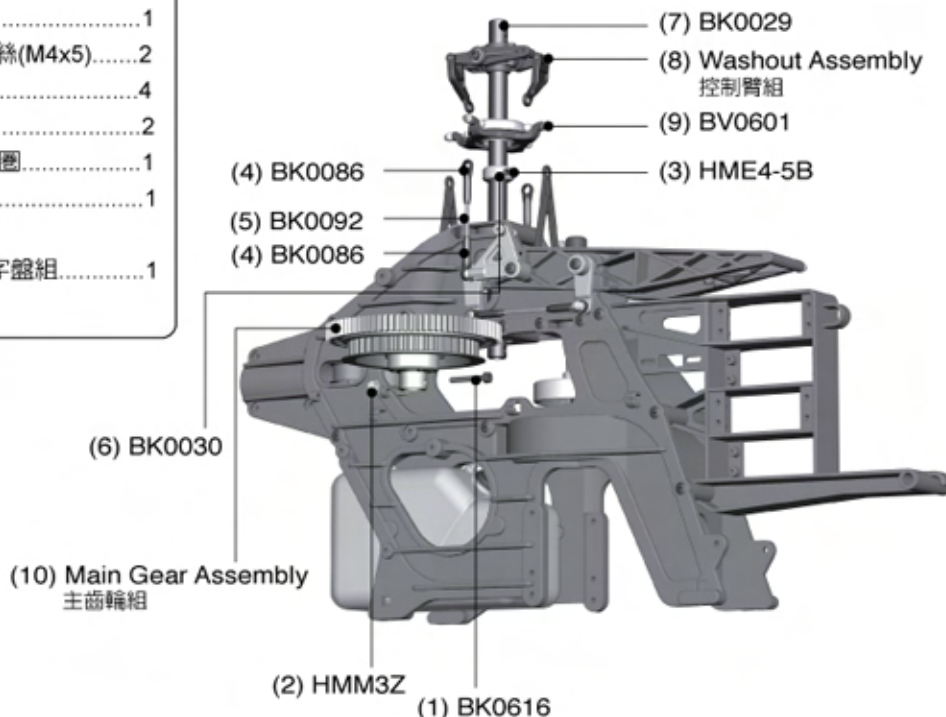
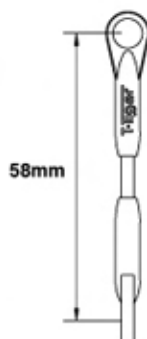
自攻螺絲必須確實鎖緊，但不能發生過度鎖緊而導致滑牙或斷裂現象。

⑦ Main Frame Assembly-Part3 主側板組裝步驟-3

Insert Main Shaft through the shaft bearings making sure that the end with the holes closest to the end is pointed down. Next, slide main gear assembly into position on the shaft and line up the holes in the main shaft with the holes in one way clutch shaft of the main gear assembly. Insert the socket head screw and secure with the lock nut. Next, slide on the mainshaft lock ring on top of the main shaft bearing and secure with the two set screws. Then slide on the swash plate assembly and attach the elevator and aileron control linkages to the outside swash plate linkage balls. Next, slide on washout assembly and attach washout linkage to the inner linkage balls of the swash plate.

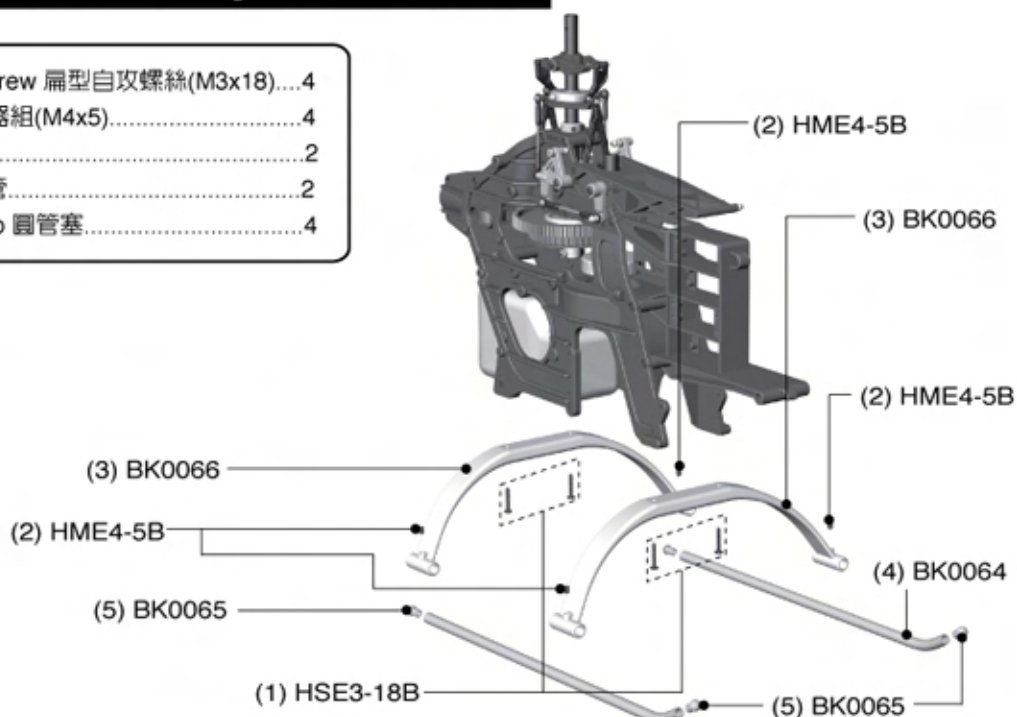
主軸穿過機身兩個主軸軸承後，固定主軸時先從主齒輪部分固定、鎖緊，然後將主軸往上提至無虛位後穿上主軸止檔圈，上無頭內六角螺絲固定（需抹螺絲防鬆膠）。然後再穿入十字盤，將升降舵連接座裝上，再穿入控制臂組。

- (1) BK0616 Socket Screw 內六角螺絲(M3x20).....1
- (2) HMM3Z Lock Nut (M3) 止鬆螺帽.....1
- (3) HME4-5B Set Screw 無頭內六角螺絲(M4x5).....2
- (4) BK0086 Ball Link 單頭連接桿.....4
- (5) BK0092 Linkage Rod 連接桿.....2
- (6) BK0030 Main Shaft Lock Ring 止檔圈.....1
- (7) BK0029 Main Shaft 主軸.....1
- (8) Wash Out Assembly 控制臂組
- (9) BV0601 Swash Plate Assembly 十字盤組.....1
- (10) Main Gear Assembly 主齒輪組



⑧ Landing Skid Assembly 腳架組裝步驟

- (1) HSE3-18B Self Tapping Screw 扁型自攻螺絲(M3x18)....4
- (2) HME4-5B Set Screw 離合器組(M4x5).....4
- (3) BK0066 Skid Brace 支撐架.....2
- (4) BK0064 Skid Pipe 底座圓管.....2
- (5) BK0065 Skid Pipe End Cap 圓管塞.....4



⑨ Engine Assembly 引擎動力組組裝步驟

Note:

A piston lock purchased from your dealer will make this a much easier task. You must replace the standard throttle arm w/the extended throttle arm and attach the linkage ball.

注意:

在將冷卻風扇裝置到引擎上時，必須在曲軸或是風扇固定孔、曲軸固定螺帽及離合器固定螺絲上塗上螺絲防鬆膠，確實固定。

Come with the Engine. Tighten the engine nut securely by grabbing the plastic fan with a towel. 務必確實鎖緊風扇固定螺帽。請使用引擎本身附屬的零件，套件中並未包含。

Add Blue Loctite
加上缺氧膠鎖緊

(1) HMC3-10B

(2) BV0589

(5) BK0170

(3) BV0038

Linkage Ball to throttle Arm.
節氣閥控制搖臂上的球座須先固定。

(3) No.9604

- | | |
|---------------------------------------------|---|
| (1) HMC3-10B Socket Screw 內六角螺絲(M3x10)..... | 2 |
| (2) BV0589 Clutch Shoe 離合器組..... | 1 |
| (3) BV0038 Cooling Fan 冷卻風扇組..... | 1 |
| (4) No.9604 TT PRO-39H(R) Engine 引擎..... | 1 |
| (5) BK0170 Shim 離合器墊片..... | 1 |

⑩ Main Frame Assembly-Part4 主側板組裝步驟-4

Add blue Loctite to all metal screw surfaces. After installing the engine, connect the silicone fuel tube to the carburetor and muffler.

組裝的順序是將引擎組先裝置在引擎座上，然後再將引擎組裝置在機身上，消音器是最後組裝的，所有的螺絲都必須上防鬆膠並確實鎖緊。

- | | |
|---------------------------------------------|---|
| (1) HMC3-14B Socket Screw 內六角螺絲(M3xH)..... | 8 |
| (2) HMC3-35B Socket Screw 內六角螺絲(M3x32)..... | 2 |
| (3) BK0087 Flat Washer 墊圈..... | 4 |
| (4) BK0037 Engine Mount 引擎固定座..... | 1 |
| (5) No.9219 Muffler 消音器組..... | 1 |
| (6) Engine Assembly 引擎動力組..... | 1 |
| (7) BA1578 Muffler Gasket 消音器墊片..... | 1 |

(1) HMC3-14B

Add Blue Loctite
加上缺氧膠鎖緊

(3) BK0087

(1) HMC3-14B
Add Blue Loctite
加上缺氧膠鎖緊

(6) Engine Ass'y
引擎動力組

(2) HMC3-35B

(5) No.9219

(7) BA1578

(1) HMC3-14B

(4) BK0037

Engine mount Attachment.
套件內含引擎固定座

11 Main Rotor Head Assembly 主旋翼頭的組裝步驟

Assembly Hint: Start from the bottom of the main Rotor Hub and work your way up to the flybar assembly. When screwing on the flybar paddles to the flybar, stop when you can see the rod in the window of the paddle. Then, lay the assembly on a flat surface and align the paddles so they are exactly parallel. Insert and tighten the set screws. Attach the flybar control rod to the flybar control arm and use the Double Link to connect the mixing lever (short side) to the Main rotor Pitch Housing.

整個旋翼頭組由主旋翼轉座開始，固定軸承的自攻螺絲必須塗上防鬆膠後再鎖上，旋翼頭的緩衝橡皮、內外徑先塗上矽質潤滑油後再塞進固定座中，裝置穩定翼操控環時需注意開口有方向性，穩定翼固定桿（平衡桿）裝置時需注意兩端必須絕對等長，穩定翼轉臂鎖定的角度、兩端必須平行，穩定翼鎖進的位置、可由預留的鑿孔中識別、兩個穩定翼鎖進的位置必須一致，穩定翼的角度可以使用兩支夾角量規、各固定住單一穩定翼來作調整，所使用的自攻牙螺絲可視需要使用螺絲防鬆膠，特別注意螺絲必須確實鎖緊，但是也不能因此發生過度鎖緊、而致使發生滑牙現象。

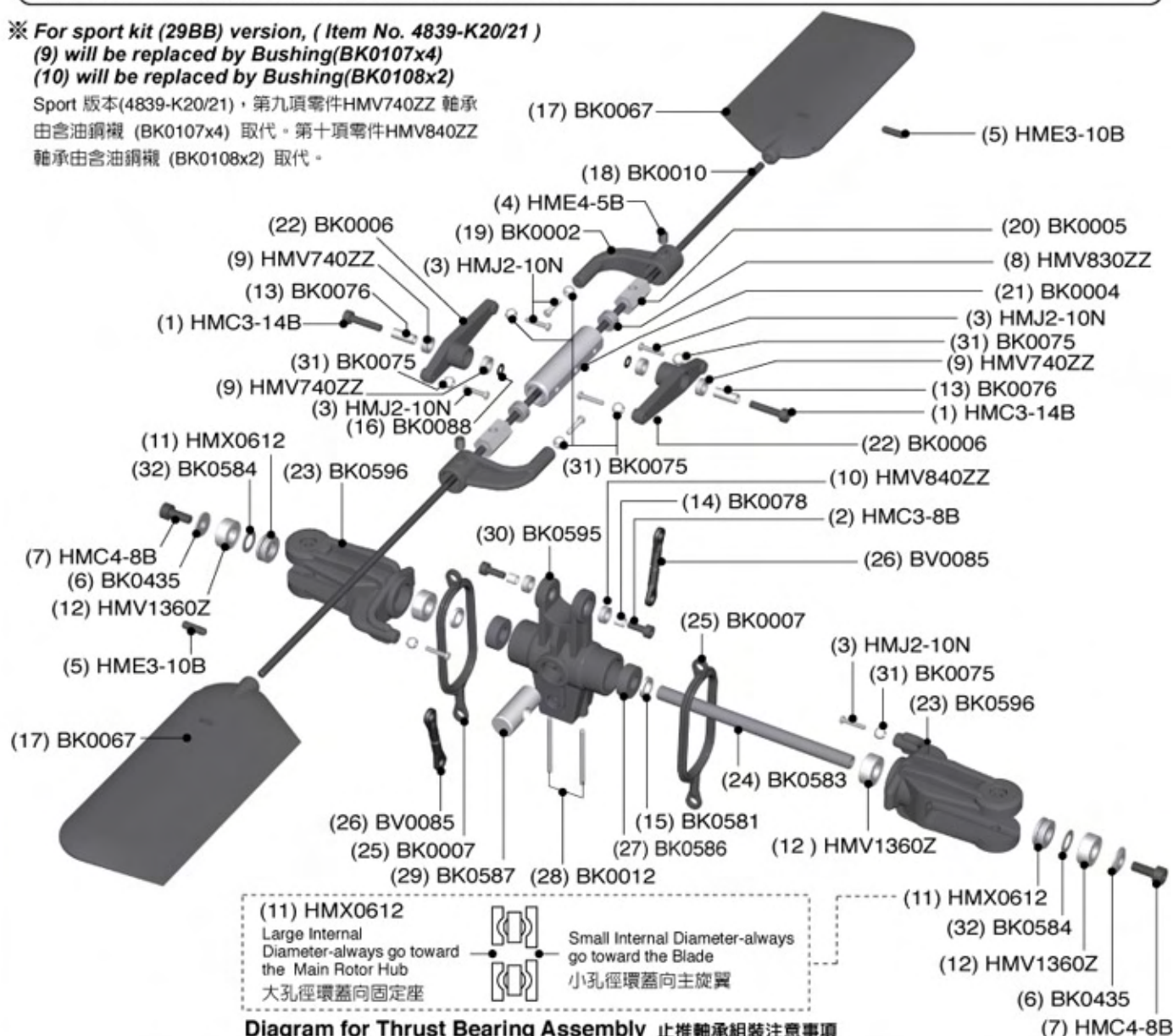
(1) HMC3-14B Socket Screw 內六角螺絲(M3x14).....	2	(17) BK0067 Flybar Paddle 穩定翼.....	2
(2) HMC3-8B Socket Screw 內六角螺絲(M3x8).....	2	(18) BK0010 Flybar Rod 穩定翼固定桿.....	1
(3) HMJ2-10N Self Tapping Screw 自攻螺絲(M2x10).....	8	(19) BK0002 Flybar Control Arm 穩定翼轉臂.....	2
(4) HME4-5B Set Screw 無頭內六角螺絲(M4x5).....	2	(20) BK0005 Flybar Arm Bushing 轉臂六角襯套.....	2
(5) HME3-10B Set Screw 無頭內六角螺絲(M3x10).....	2	(21) BK0004 Flybar Seesaw Hub 穩定桿固定軸.....	1
(6) BK0435 Washer 墊圈(d4xD11xW1.7).....	2	(22) BK0006 Mixing Lever 控制搖臂.....	2
(7) HMC4-8B Socket Screw 內六角螺絲(M4x8).....	2	(23) BK0596 Main Rotor Pitch Housing 主旋翼轉座.....	2
(8) HMV830ZZ Bearing 軸承(d3xD8xW4).....	2	(24) BK0583 Feathering Shaft 固定軸.....	1
※(9) HMV740ZZ Bearing 軸承(d4xD7xW2.5).....	4	(25) BK0007 Flybar Control Rod 穩定翼操控環.....	2
※(10) HMV840ZZ Bearing 軸承(d4xD8xW3).....	2	(26) BV0085 Double Link 雙頭連接.....	2
(11) HMX0612 Thrust Bearing 止推軸承.....	2	(27) BK0586 Flap Damper 避震墊圈.....	2
(12) HMV1360Z Bearing 滾珠軸承(d6xD13xW5).....	4	(28) BK0012 Pin 固定銷.....	2
(13) BK0076 Collar 軸環.....	2	(29) BK0587 Main Rotor Hub Pin 主旋翼固定座銷.....	1
(14) BK0078 Collar 軸環.....	2	(30) BK0595 Main Rotor Hub 主旋翼固定座.....	1
(15) BK0581 Flap Collar 避震軸環.....	2	(31) BK0075 Ball Link 連接球頭.....	8
(16) BK0088 Flat Washer 墊片.....	2	(32) BK0584 Thrust Washer 止推墊片.....	2

※ For sport kit (29BB) version, (Item No. 4839-K20/21)

(9) will be replaced by Bushing(BK0107x4)

(10) will be replaced by Bushing(BK0108x2)

Sport 版本(4839-K20/21)，第九項零件HMV740ZZ 軸承由含油鋼襯 (BK0107x4) 取代。第十項零件HMV840ZZ 軸承由含油鋼襯 (BK0108x2) 取代。

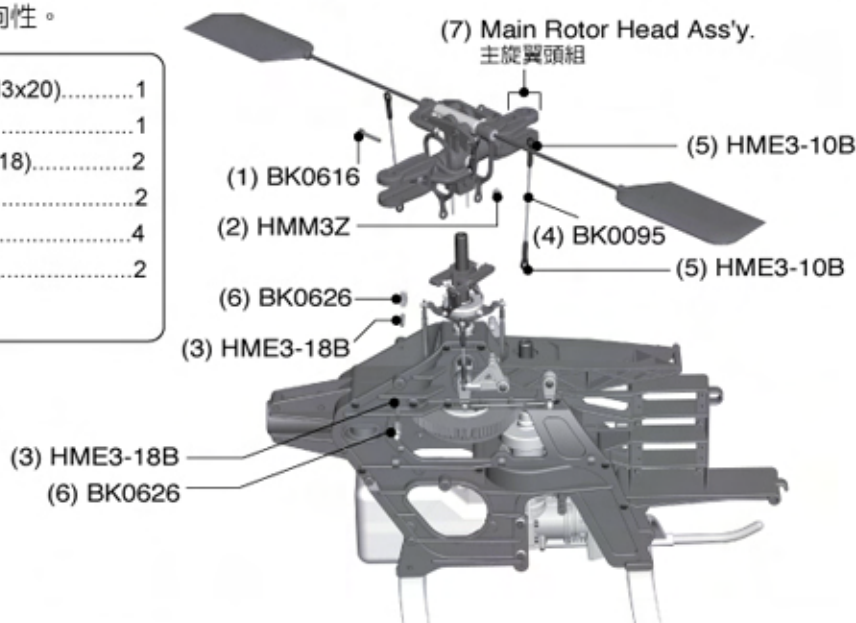
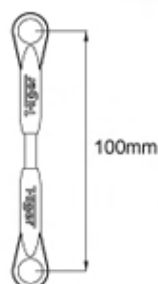


12 Main Frame Assembly-Part5 主側板組裝步驟-5

Slide the main Rotor assembly over the main shaft and align the two pins to slide in the washout assembly. Make sure the holes in the main shaft line up with the holes in the main rotor head. Insert the socket screw and secure with locknut. Attach the ball linkage rods to the long end of the mixing lever and to the remaining inside linkage balls of the swash plate.

主軸穿過機身兩個主軸軸承後，固定主軸時先從主齒輪部分固定、鎖緊，然後將主軸往上提至無虛位後穿上主軸止檔圈，上無頭內六角螺絲固定（需抹螺絲防鬆膠）。然後再穿入十字盤，將升降舵連接座裝上，再穿入控制臂組。裝置連接桿時，儘可能確保單頭連接桿的方向性。

- | | |
|------------------------------------------------|---|
| (1) BK0616 Socket Screw 內六角螺絲(半牙) (M3x20)..... | 1 |
| (2) HMM3Z Lock Nut 止鬆螺帽(M3)..... | 1 |
| (3) HME3-18B Set Screw 無頭內六角螺絲(M3x18)..... | 2 |
| (4) BK0095 Linkage Rod 連接桿..... | 2 |
| (5) BK0086 Ball Link 單頭連接桿..... | 4 |
| (6) BK0626 Canopy Retaining Post 機身固定柱..... | 2 |
| (7) Main Rotor Head Assembly 主旋翼頭組 | |



13 Tail Unit Assembly 尾旋翼系統組裝步驟

Assembly Tip: Work from left to right when assembling the parts. The tail pitch control lever screws into the arm extending from the tail unit housing.

組裝程序由左至右順序組裝，需注意的重點

1. 尾輪固定銷之固定螺絲必須確實上防鬆膠固定。
2. 尾旋翼固定座之固定螺絲，必須確實對準尾軸之定位點、確實上防鬆膠鎖緊。
3. 尾旋翼控制軸套與尾旋翼控制座、鎖緊時必須確認不能有偏擺的情形發生，鎖緊後視實際情形鬆退至軸承滑順滾動，但不能因此發生間隙。

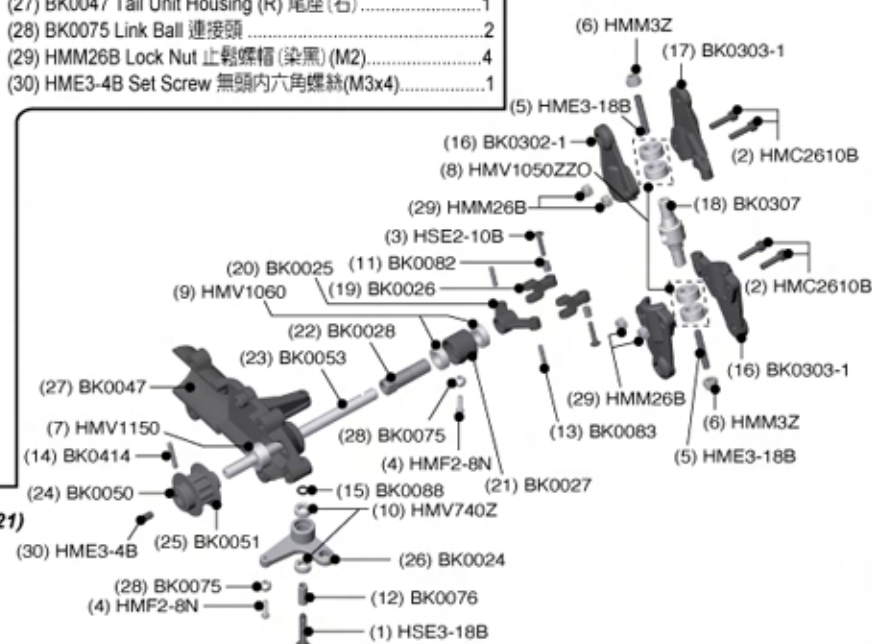
- | | | | |
|-----------------------------------------------------------|---|--------------------------------------------------|---|
| (1) HSE3-18B Self Tapping Screw 扁圓型自攻螺絲(M3x18)..... | 1 | (23) BK0053 Tail Rotor Shaft 尾旋翼軸..... | 1 |
| (2) HMC2610B Socket Screw 內六角螺絲(M2.6x10)..... | 4 | (24) BK0050 Tail Pulley 尾輪..... | 1 |
| (3) HSE2-10B Self Tapping Screw 扁圓型自攻螺絲(M2x10)..... | 2 | (25) BK0051 Tail Pulley Flange 尾輪緣..... | 1 |
| (4) HMF2-8N Screw 圓頭十字螺絲(M2x8)..... | 2 | (26) BK0024 Tail Pitch Control Lever 尾旋翼控制桿..... | 1 |
| (5) HME3-18B Set Screw 無頭內六角螺絲(M3x18)..... | 2 | (27) BK0047 Tail Unit Housing (R) 尾座(右)..... | 1 |
| (6) HMM3Z Lock Nut 止鬆螺帽(M3)..... | 2 | (28) BK0075 Link Ball 連接頭..... | 2 |
| (7) HMV1150 Bearing 軸承(d5xD11xW5)..... | 1 | (29) HMM26B Lock Nut 止鬆螺帽(染黑)(M2)..... | 4 |
| (8) HMV1050ZZO Angular Bearing 軸承(d5xD10x4)..... | 4 | (30) HME3-4B Set Screw 無頭內六角螺絲(M3x4)..... | 1 |
| (9) HMV1060 Bearing 軸承(d6xD10xW3)..... | 2 | | |
| (10) HMV740ZZ Bearing 軸承(d4xD7xW2.5)..... | 2 | | |
| (11) BK0082 Collar 軸環(2x3x4)..... | 2 | | |
| (12) BK0076 Collar 軸環(3x4x10)..... | 1 | | |
| (13) BK0083 Pin 固定銷(2x9)..... | 2 | | |
| (14) BK0414 Pin 固定銷(2x12)..... | 1 | | |
| (15) BK0088 Flat Washer 墊片..... | 1 | | |
| (16) BK0302-1 Tail Pitch Housing (A) 尾旋翼座..... | 2 | | |
| (17) BK0303-1 Tail Pitch Housing (B) 尾旋翼座(B)..... | 2 | | |
| (18) BK0307 Tail Rotor Hub 尾旋翼固定座..... | 1 | | |
| (19) BK0026 Tail Pitch Control Link 尾旋翼連接頭..... | 2 | | |
| (20) BK0025 Tail Pitch Control Fork 尾旋翼控制座..... | 1 | | |
| (21) BK0027 Tail Pitch Control Slider 尾旋翼控制滑座..... | 1 | | |
| (22) BK0028 Tail Pitch Control Slide Bushing 尾旋翼控制軸套..... | 1 | | |

※ For sport kit (29BB) version, (Item No. 4839-K20/21)

(10) will be replaced by Bushing(BK0107x4)

Sport 版本(4839-K20/21) ,

第十項零件HMV740ZZ 軸承由含油鋼襯 (BK0107x4) 取代。



14 Tail Boom Assembly 尾管組裝步驟

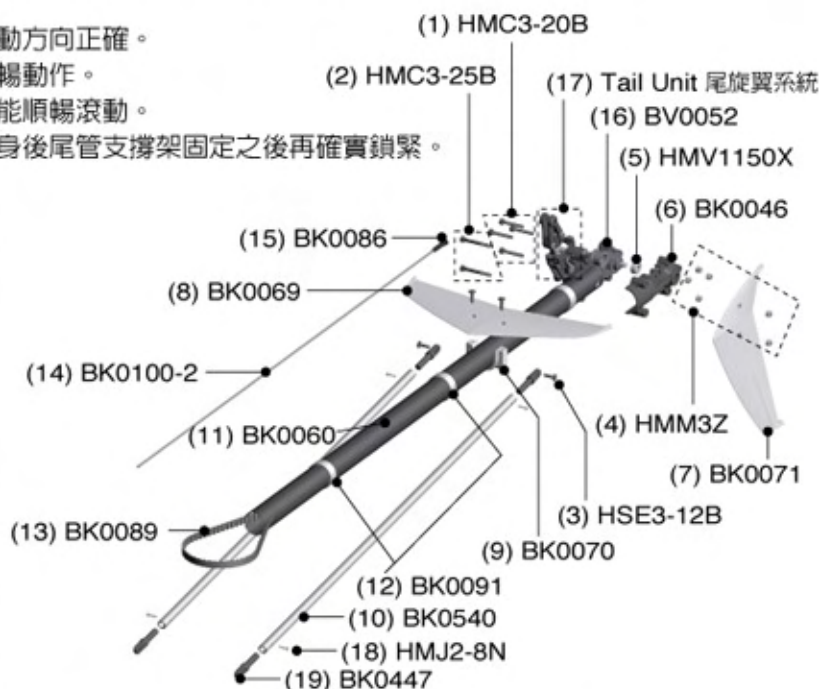
Assembly Tip: Slide the 3 rod guides onto the boom and space them out evenly as shown. Then slide the tail linkage rod into the rod guides. Next, insert the tail rotor drive belt into the boom so that it comes out of both ends. Place drive belt over tail drive pulley and complete balance of tail boom assembly. Remember to connect the tail linkage rod to the tail control lever.

先將推桿固定環穿入尾管、再穿入尾舵推桿以及皮帶，之後再進行尾齒輪箱的組裝工作。

組裝時需注意：

1. 時規皮帶不可以有繞纏的現象、同時需確認傳動方向正確。
2. 推桿固定環必須調整為直線，以讓尾舵推桿順暢動作。
3. 皮帶壓輪的固定螺絲不可以鎖死，必須讓壓輪能順暢滾動。
4. 水平安定面固定螺絲不需先鎖死，待組裝到機身後尾管支撐架固定之後再確實鎖緊。

(1) HMC3-20B Socket Screw 內六角螺絲(M3x20).....	4
(2) HMC3-25B Socket Screw 內六角螺絲(M3x25).....	2
(3) HSE3-12B Self Tapping Screw 扁圓型自攻螺絲(M3x12).....	4
(4) HMM3Z Lock Nut 止鬆螺帽(M3).....	6
(5) HMV1150X Bearing 軸承(d5xD11xW5).....	1
(6) BK0046 Tail Unit Housing (L) 尾座(左).....	1
(7) BK0071 Vertical Fin 垂直安定面.....	1
(8) BK0069 Stabilizer Fin 水平安定面.....	1
(9) BK0070 Stabilizer Fin Bracket 固定座.....	1
(10) BK0540 Tail Support Rod 尾管支撐架.....	2
(11) BK0060 Tail Boom 尾管.....	1
(12) BK0091 Rod Guide 固定環.....	3
(13) BK0089 Tail Rotor Drive Belt 正時皮帶(630XL).....	1
(14) BK0100-2 Tail Linkage Rod 推桿-2.....	1
(15) BK0086 Ball Link 球頭連接桿.....	1
(16) BV0052 Tail Idle Pulley 小惰輪組.....	1
(17) Tail Unit 尾旋翼系統.....	
(18) HMJ2-8N Self Tapping Screw 自攻螺絲(M2x8).....	4
(19) BK0447 Tail Support Rod End 尾管支撐架接頭.....	4



15 Main Frame Assembly-Part6 主側板組裝步驟-6

(1) HMC3-14B Socket Screw 內六角螺絲(M3x14).....	2
(2) HMC3-20B Socket Screw 內六角螺絲(M3x25).....	4
(3) HSE3-12B Self Tapping Screw 扁圓型自攻螺絲(M3x12).....	2
(4) HMM3Z Lock Nut 止鬆螺帽(M3).....	6
(5) BK0068 Tail Rotor Blade 尾旋翼.....	2
(6) Tail Assembly 尾管組.....	

1. Insert the four HMC3-20B socket screws into the tail base of the Main Frame and secure with lock nuts. **Do not tighten at this point.**
2. Hold the tail boom in one hand and hook your index finger on your free hand through the exposed loop of the tail rotor drive belt.
3. Hold it so the belt is vertical and parallel to the tail drive pulley.

① Boom Drive belt

Important: Next, rotate the belt 90-degree counter clockwise.

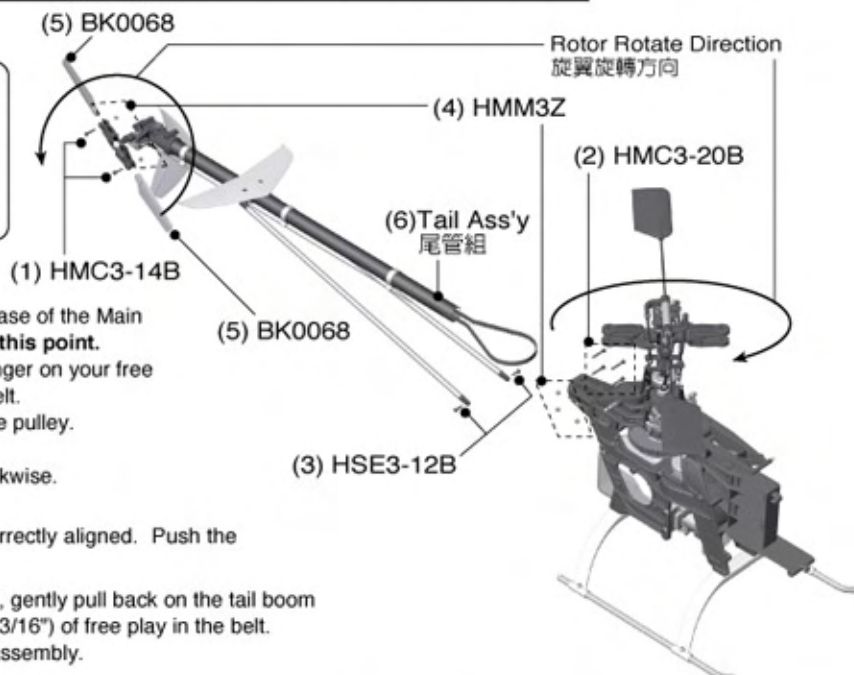
⊖ 90-degree

Pull the belt through the tail base, keeping the belt correctly aligned. Push the tail boom into the tail base all the way to the end.

4. Place the drive belt over the tail drive spur gear. Then, gently pull back on the tail boom until the tension on the belt allows no more than 5mm(3/16") of free play in the belt.
5. Tighten the locknuts and proceed with the rest of the assembly.

組裝順序：

1. 先將HMC3-20B內六角螺絲穿入機身左側螺絲孔中，反側穿入HMM3Z 止鬆螺帽，然後將螺絲稍旋入螺帽中固定，暫無需鎖緊。
 2. 裝置尾管組時需注意驅動皮帶的方向，順著尾皮帶輪的角度將皮帶反時針方向轉90度，再將皮帶穿入機身中。
 3. 使用平口螺絲起子將尾管固定座稍微撐開，順序穿入皮帶、尾管，尾管定位後必須插至底部，以使皮帶有充足空間裝入主皮帶輪中；當皮帶完整裝入主皮帶輪後必須確認雙邊皮帶必須納入主惰輪皮帶槽中。
 4. 驅動皮帶裝入主皮帶輪後，將尾管往後拉至適當的鬆緊度，皮帶的鬆緊度大約為使用手指壓迫皮帶、約能下陷0.5公分左右的距離；然後再將尾管固定座的尾管固定螺絲鎖緊。
- ※當您進行新機子的組裝、或是更換新皮帶時，建議您必須每次飛行時檢視皮帶鬆緊度，新時規皮帶在首次使用約3-4趟的週期內，會有一些延展的情形發生，並建議您適度調整，否則過鬆的時規皮帶會發生邊緣耗損或是使用中脫齒的現象。
5. 將尾管支撐架的自攻螺絲以及水平尾翼的自攻螺絲鎖緊，注意水平尾翼的裝配位置、儘可能的與機身垂直。



16 Servo Installation-Part1 伺服機的裝配步驟-1

Assembly Tip: Remove all the servo wheels prior to attaching the steel linkage balls. Ensure all linkages are the correct length.

在組裝時需注意：除了各項系統所要求的連接桿長度外，單頭連接桿在組裝時也有方向性，請將單頭連接桿的廠商標記保持在球頭座的外側。

伺服機均附有專用的固定座銅襯（附屬於遙控系統中），每一個伺服機請確實的將該銅襯裝置妥當，以免伺服機因撞擊或是震動損傷，正確的裝配方式是銅襯的凸緣必須裝置在底部的位置。

(1) HSE2612N Self Tapping Screw 扁圓型自攻螺絲(M2.6x12).....	12
(2) HMF2-8N Screw 圓頭十字螺絲(M2x8).....	4
(3) HML2 Hex Nut 六角螺帽(M2).....	4
(4) HME4-5B Set Screw 無頭內六角螺絲(M4x5).....	2
(5) BK0093 Linkage Rod 連接桿.....	2
(6) BK0094 Linkage Rod 連接桿.....	1
(7) BK0100-1 Linkage Rod 推拉桿-1.....	1
(8) BK0105 Tail Control Rod Joint 尾控制桿軸環.....	1
(9) BK0075 Linkage Ball 連接頭.....	4
(10) BK0086 Ball Link 單頭連接桿.....	7



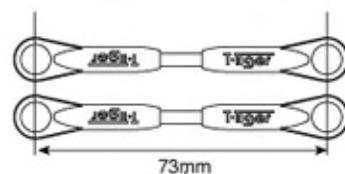
Before installing Aileron Servo, tape the wire as shown.

裝置副翼伺服器實，建議先將電線反折並使用膠帶固定。

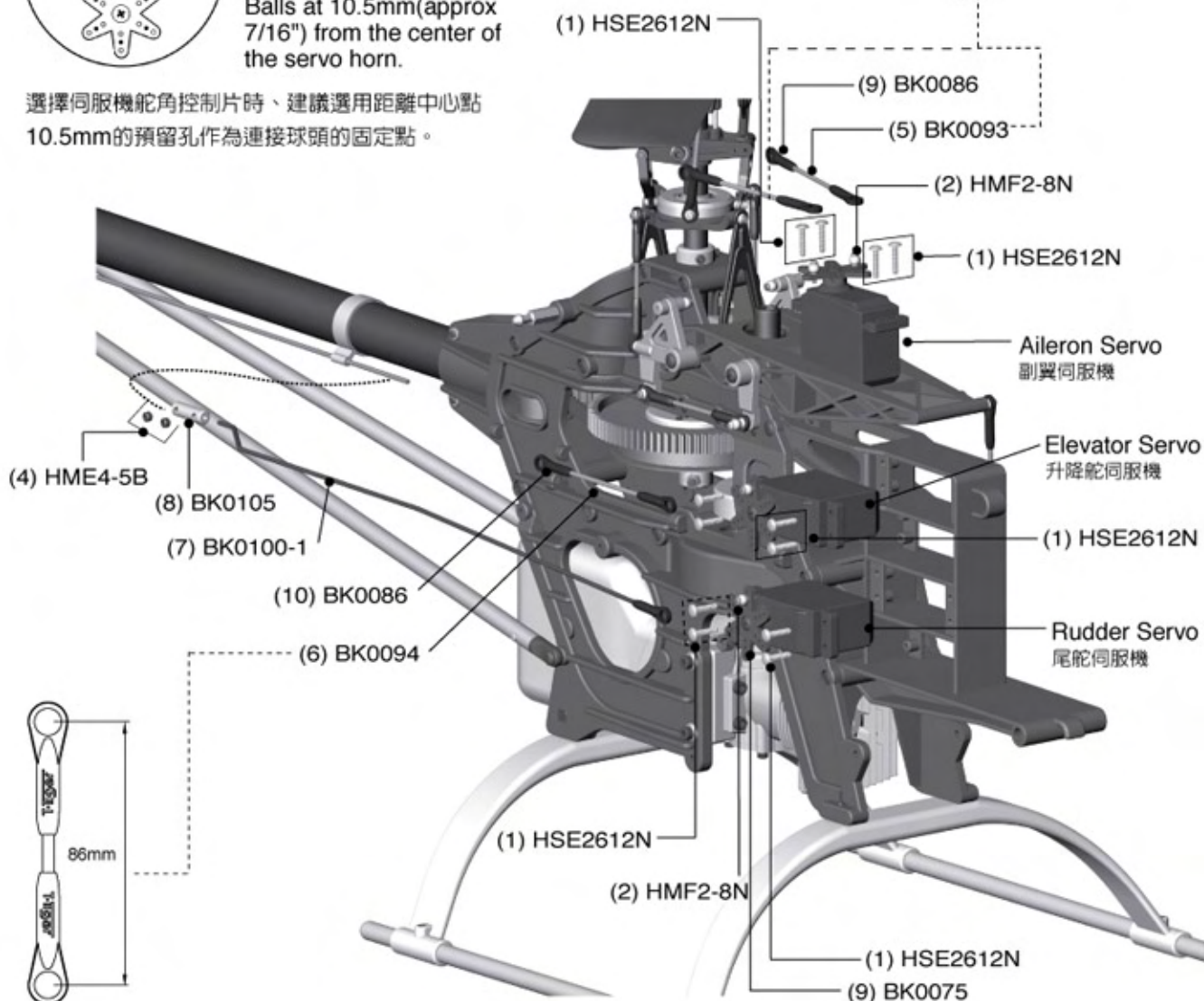


Mount the Steel Linkage Balls at 10.5mm(approx 7/16") from the center of the servo horn.

選擇伺服機舵角控制片時、建議選用距離中心點10.5mm的預留孔作為連接球頭的固定點。



73mm



17 Servo Installation-Part2 伺服機的裝配步驟-2

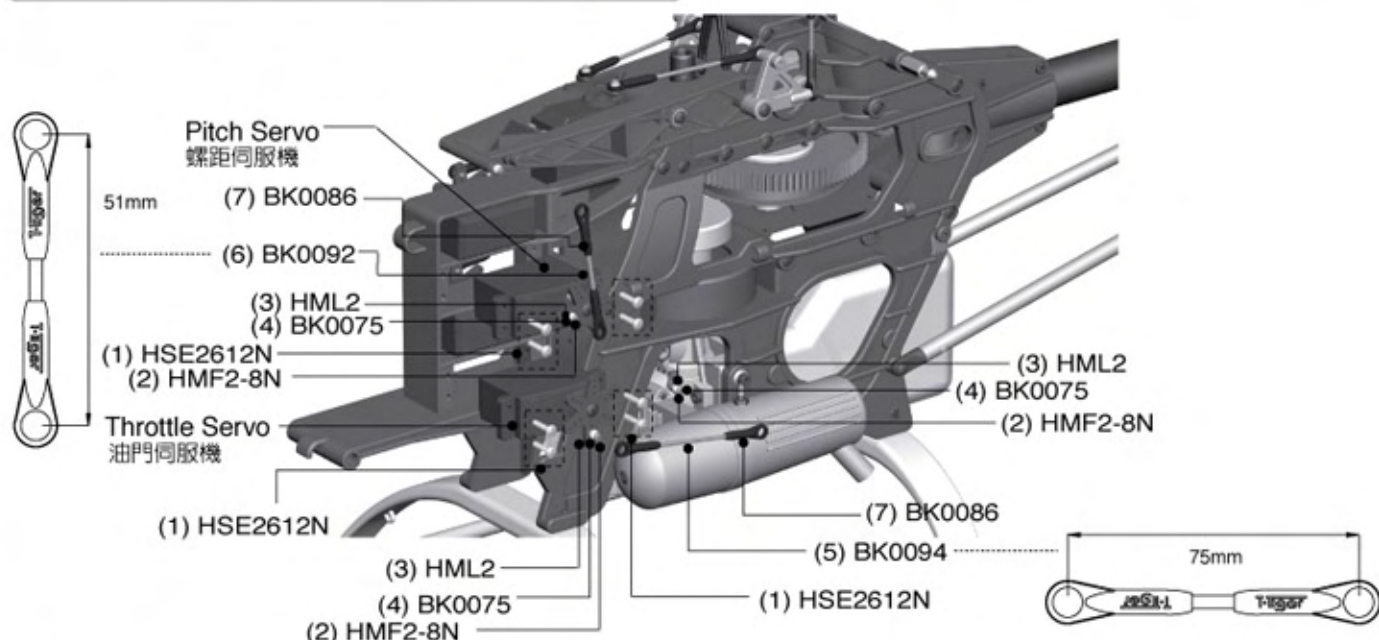
Assembly Tip: Remove all the servo wheels prior to attaching the steel linkage balls. Make sure all linkages are the correct length.

在組裝時需注意：除了各項系統所要求的連接桿長度外，單頭連接桿在組裝時也有方向性，請將單頭連接桿的廠商標記保持在球頭座的外側。

- | | |
|-------------------------------------------------------|---|
| (1) HSE2612N Self Tapping Screw 扁圓型自攻螺絲(M2.6x12)..... | 8 |
| (2) HMF2-8N Screw 圓頭十字螺絲(M2x8)..... | 3 |
| (3) HML2 Hex Nut 六角螺帽(M2)..... | 3 |
| (4) BK0075 Linkage Ball 連接球頭(M2.3xL60)..... | 3 |
| (5) BK0094 Linkage Rod 連接桿(M2.3xL30)..... | 1 |
| (6) BK0092 Linkage Rod 連接桿(M3x18)..... | 1 |
| (7) BK0086 Ball Link 單頭連接桿(M2.3x18)..... | 4 |

Mount the Steel Link Ball at 10.5mm(approx 7/16") from the center of the servo horn.

選擇伺服機舵角控制片時，建議選用距離中心點10.5mm的預留孔作為連接球頭的固定點。

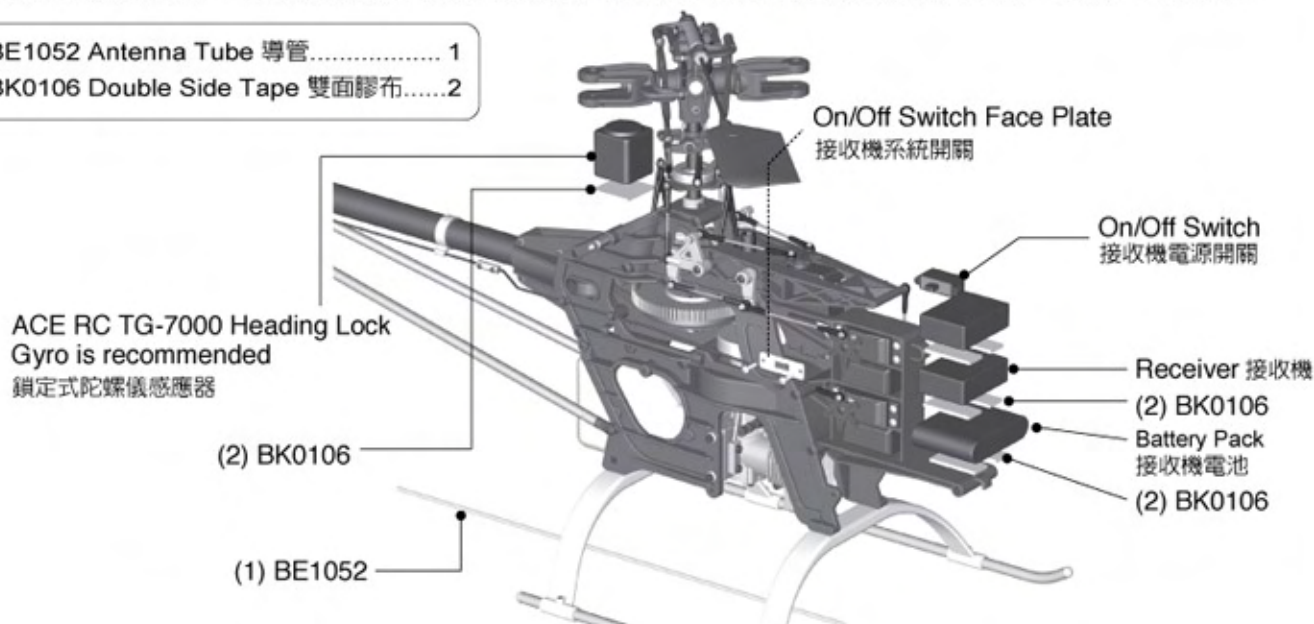


18 Receiver/Gyro Installation 接收機/陀螺儀的安裝步驟

Thunder Tiger recognizes that there are many brands of radios and gyros to choose from. You are encouraged to seek the advice of experienced helicopter pilots when making this decision. We do recommend the use of the ACE RC TG-7000 Heading Lock Gyro since it was designed expressly for this machine.

關於控制系統以及修正尾旋翼的陀螺儀機構，通常是選配另購的，以下所示範的例子陀螺儀是使用由雷虎科技出品的ACE RC代理的TG-7000鎖定式陀螺儀。其中固定陀螺儀感應器的雙面膠帶，必須使用由陀螺儀中附屬的產品，因此直昇機套件中並未包含。

- | | |
|---------------------------------------|---|
| (1) BE1052 Antenna Tube 導管..... | 1 |
| (2) BK0106 Double Side Tape 雙面膠布..... | 2 |



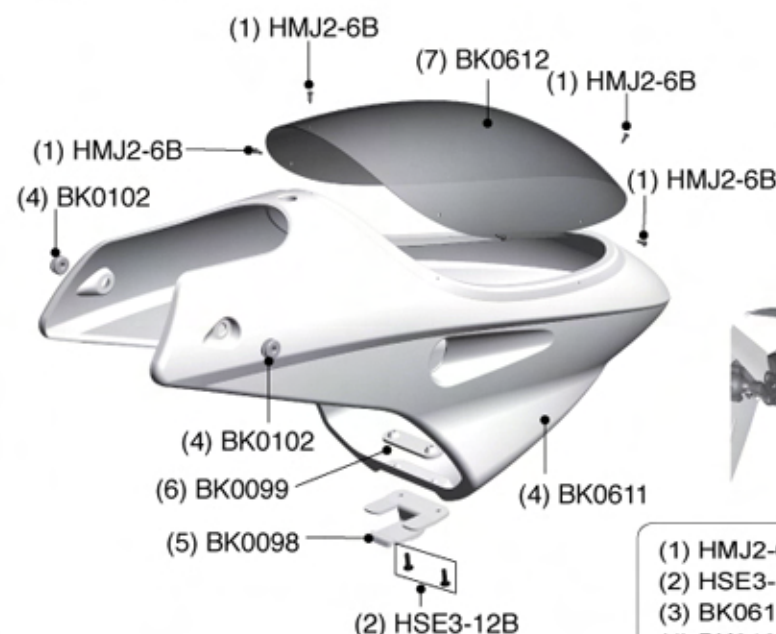
19 Canopy Assembly 機艙罩的組裝步驟

Cut off the bubble from the body leaving the lip all the way around. Neatness counts, so take your time. Next trim the flange from the canopy leaving a clean edge. You can lightly sand the edges to get it smooth and even. On the lip of the opening in the body, mark six points for drilling holes to secure canopy: 1-in front, 1-in rear and 2 on each side.

Using double stick tape secure canopy to body. Take a very sharp awl and make pilot holes through the canopy and body lip. Make sure all holes line up. Remove double stick tape and put in the self tapping screws. Install the body clip, decals, and rubber grommets.

進行此步驟前建議您先使用清潔劑將機身作完整的清潔、以使貼紙的步驟容易進行。

1. 先進行機身的裁修：若於出廠前將不需要的部分裁修掉、於運送儲存的過程中機身會有變形的狀況、因此機身以及機艙罩必須由使用者裁修；使用銳利的刀具仔細的沿著機身裁修線裁修，啟動棒入口以及機身固定墊圈裝置位置、只需要使用刀具由機身內側將凸緣完整削除、再將邊緣銳角削除即可。
2. 裝置機身夾扣的螺絲孔位置、於機身上已經有明顯的記號，建議使用3mm的鑽頭鑽孔加工、然後再進行組裝。
3. 機艙罩的裁修：於機艙罩上已經有明顯的裁修線痕跡、建議裁修時先保留1-1.5mm的位置裁修，再逐次搭配機身作修整；在搭配機身作機艙罩修整時、建議先將機身裝置在機體上、以防止因機身形狀變動所產生的機艙罩差異情形發生。
機艙罩的固定螺絲孔已經預刻記號於機艙罩上，在尺寸搭配完成後建議先用紙膠帶固定於機身上、再使用1.5mm的鑽頭鑽孔、以鎖上固定螺絲。



- | | |
|-----------------------------------------------------|---|
| (1) HMJ2-6B Self Tapping Screw 圓頭十字自攻螺絲(M2x4)..... | 6 |
| (2) HSE3-12B Self Tapping Screw 扁圓型自攻螺絲(M3x12)..... | 2 |
| (3) BK0611 Body 機身..... | 1 |
| (4) BK0102 Rubber Grommet 機身固定墊圈..... | 2 |
| (5) BK0098 Body Clip-A 機身夾扣A..... | 1 |
| (6) BK0099 Body Clip-B 機身夾扣B..... | 1 |
| (7) BK0612 Canopy 機艙罩..... | 1 |

20 Main Rotor Assembly 主旋翼的組裝步驟

Important-While Thunder Tiger takes great care to manufacture the most balanced blades available, no two rotor blades are exactly the same. It is highly recommended that you purchase a blade balancer from your hobby dealer. Follow the manufacturers instructions for balancing the blades and install on helicopter.

每一台直昇機的套件中都有附贈一對經由嚴格檢驗的質主旋翼，由於有長期儲放脫膠的疑慮、因此主旋翼與BK0073主旋翼連接座A、BK0074 主旋翼連接座B之間的上膠工作必須由使用者來進行，所需使用的環氧樹脂已經包含在套件中。

組裝主旋翼並非將它牢固的鎖緊在直昇機上、而是必須保留一點點的旋轉裕度、以供直昇機遭遇陣風時作修正之用，關於主旋翼的鬆緊度適中與否的問題、您可以請教有經驗的飛行同好幫您檢驗。

- | | |
|------------------------------------------------------|---|
| (1) BK0072 Main Rotor Blade 主旋翼組..... | 2 |
| (2) HMD2612B Self Tapping Screw 平頭十字螺絲(M2.6x12)..... | 2 |
| (3) BK0073 Upper Blade Grip 主旋翼連接座A..... | 2 |
| (4) BK0074 Lower Blade Grip 主旋翼連接座B..... | 2 |
| (5) HMM4Z Lock Nut 止鬆螺帽(M4)..... | 2 |
| (6) HMC4-27B Socket Screw 主旋翼組(M4x27)..... | 2 |

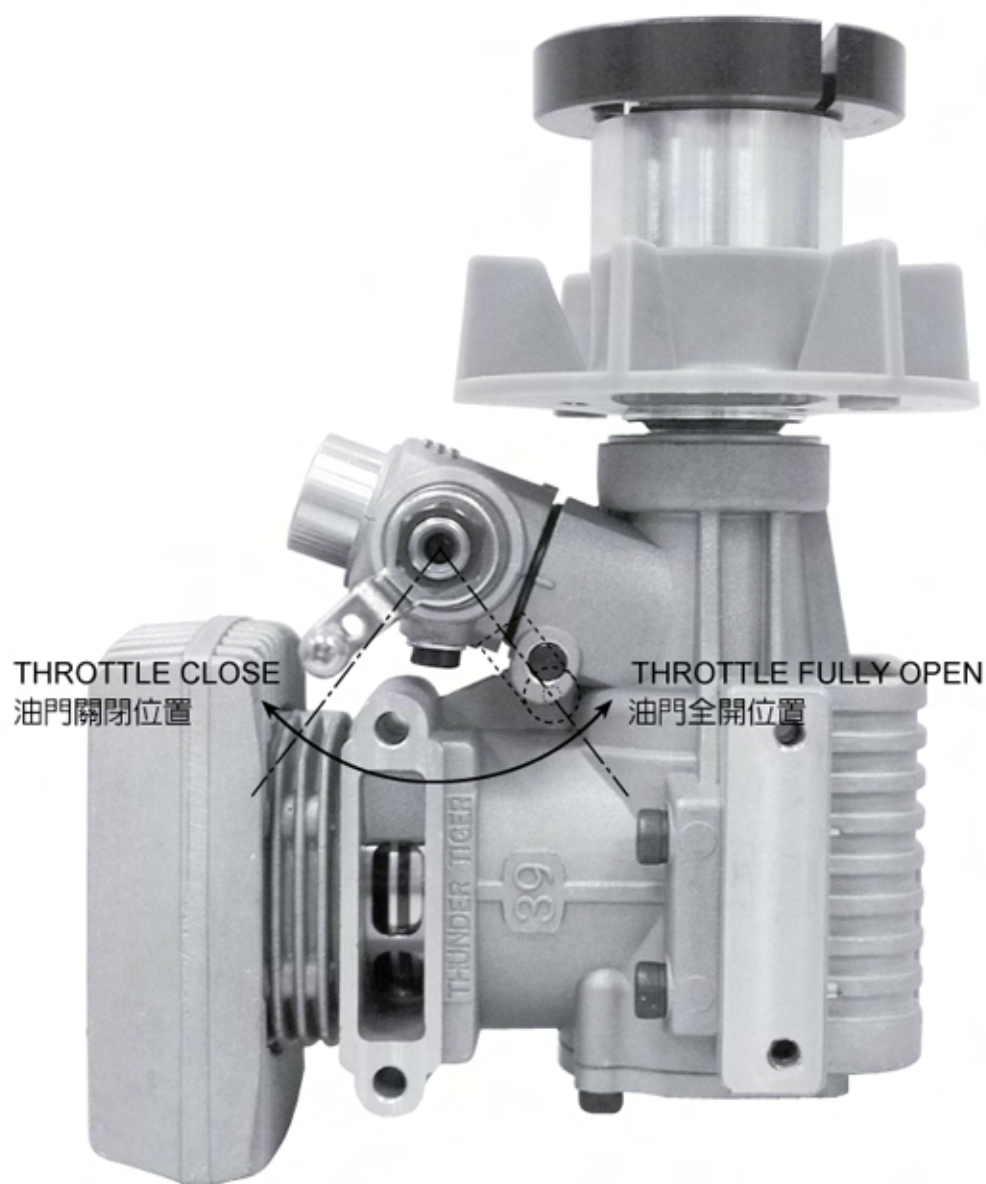


Engine Throttle Control Linkage 引擎的飛行前調整

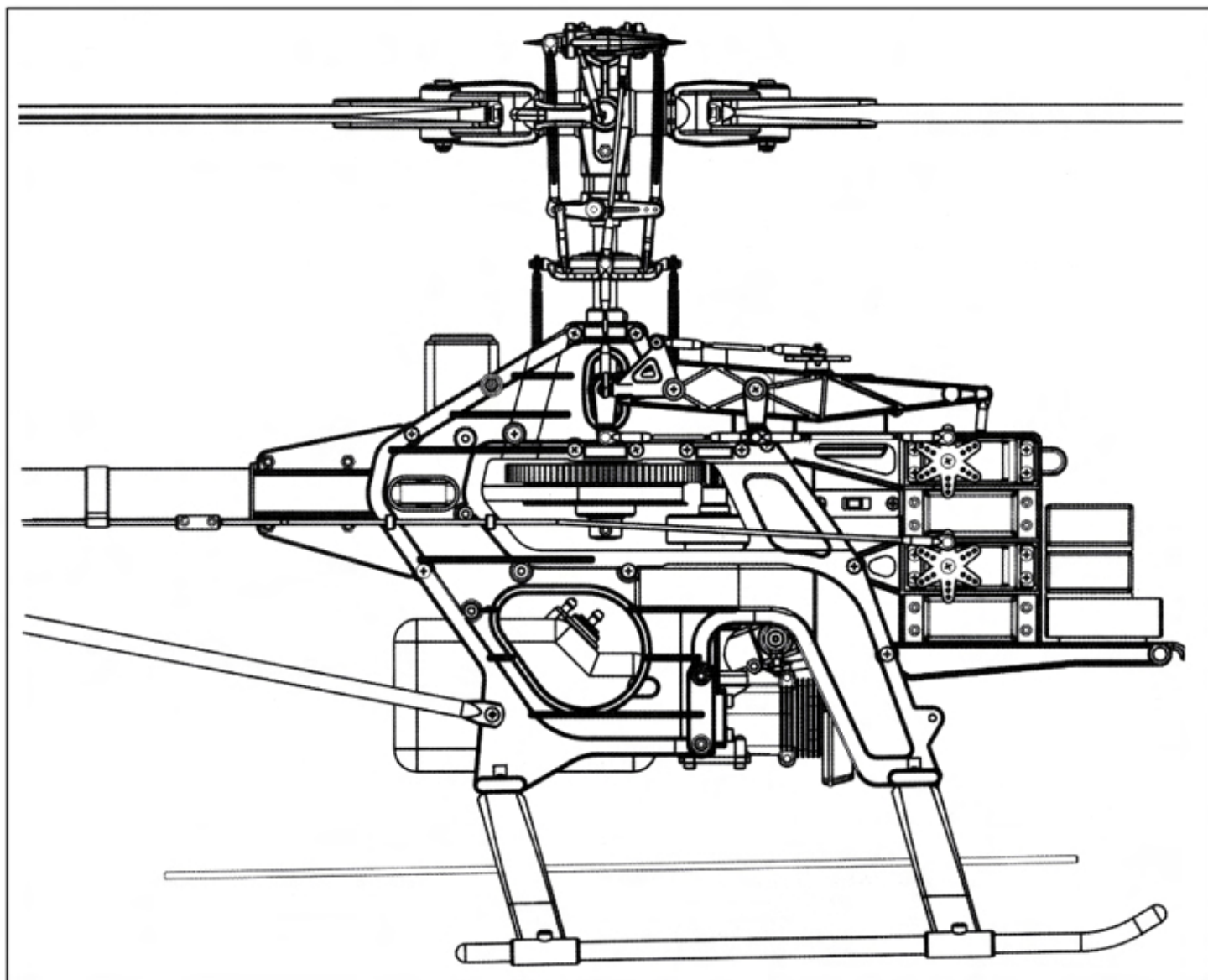
Mount the steel linkage ball to the outer hole on the metal throttle arm. At full throttle stick, the carburetor hole should open completely. At low throttle and with the throttle trim all the way down, the carburetor hole should close completely. Adjust the ATV function in your transmitter to achieve the above requirement. Listen to the servo, it should not make any binding noise. Try keep the throttle ATV between 90% and 110%. If your radio does not have ATV, then adjust the location of the steel link ball on the throttle servo horn to get the correct throttle travel.

當您裝置引擎時，建議您先在化油器的節氣閥先以油性簽字筆作關閉、中速、高速位置的記號，化油器控制搖臂裝置在機身時，必須調整至與油門伺服機控制搖臂平行的位置，通常我們建議以引擎中速位置與伺服機中速位置來作相互對照的調整依據，如此各個調整點才不會因為控制與被控制機構間的不同步，發生調整上的差異。

基本上由前面所要求的各項裝置數據均能滿足使用上的需求，當發生伺服機行程上的差異時，可以選擇使用遙控器上的ATV功能調整，但是我們建議調整的範圍雙邊（高、低速）不要有總合20%以上的調整差距，並儘可能的維持在90%到110%的範圍內：

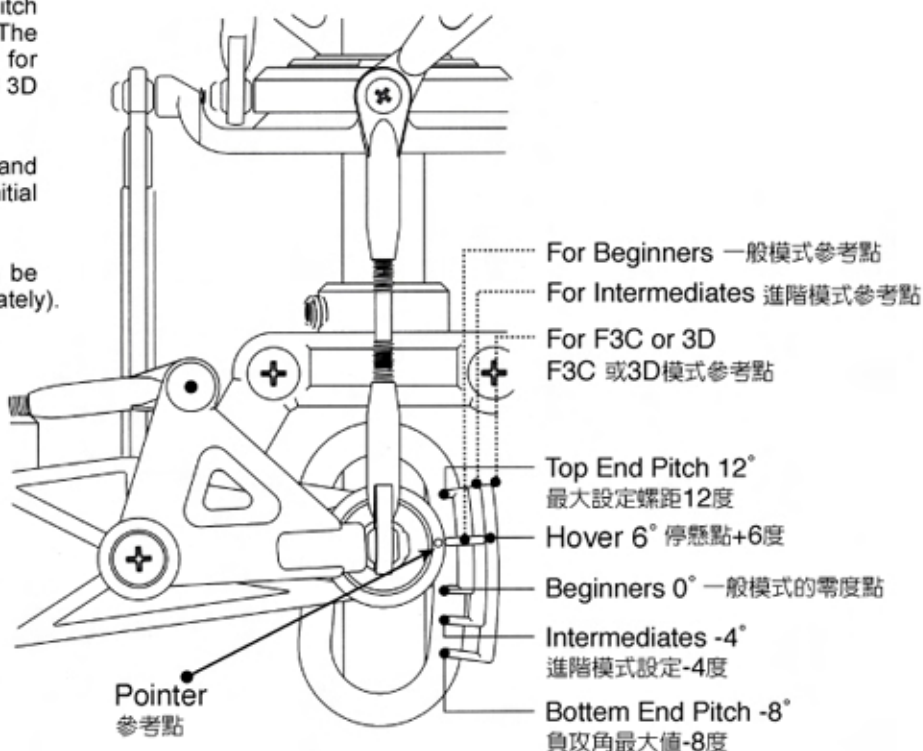


LINKAGE SET-UP SECTION 連桿長度調整



Setting up Main Rotor Blades Pitch Angle 主旋翼的攻角調整

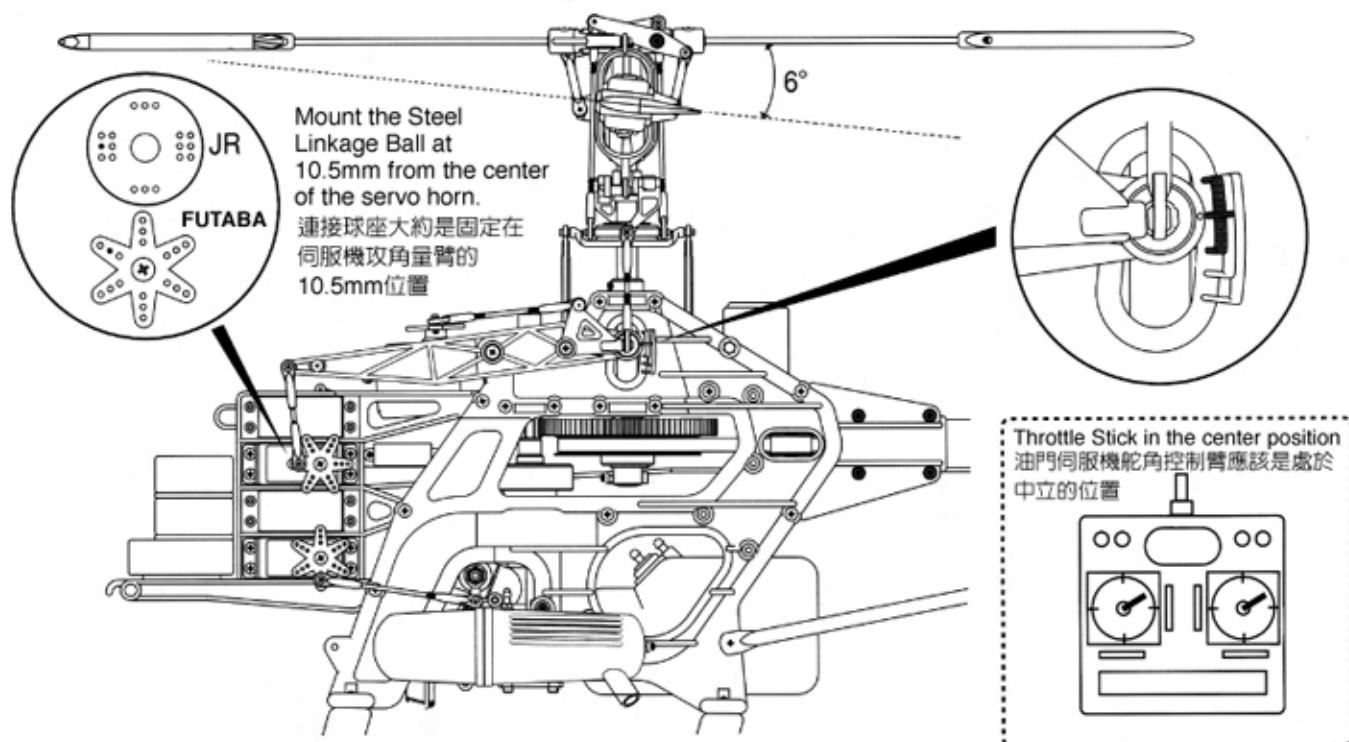
- On the left side frame, there are three pitch scales molded onto the plastic frame. The three different scales are designed for beginner, intermediate or expert F3C and 3D pilots.
- Use the "pointer" on the collective tray and the plastic molded scales to set up the initial collective control.
- The actual blade angle in degrees can be checked using a pitch gauge (sold separately).
- 將機體轉向左側，在攻角控制臂以及升降舵控制機構附近有可供參考的控制參考點，依序是一般模式、進階模式、F3C以及3D的操作模式參考點。
- 對照參考時以攻角控制臂上的基準點與機身上的參考點相互對準、以作為參考的依據。
- 雖然以上的參考點設計、在各項連接桿均依照建議值裝配時、可以讓您快速的作為調整上的基礎，但是若您需要詳細、確實的攻角角度、建議您仍需要使用攻角量規來量取。



The hovering pitch angle should be at 6°. To get the 0° to 12° collective range, mount the steel linkage ball at 10.5mm away from the center of the collective servo horn.

普遍的調整需求、通常停旋會設定為+6度，而整個螺距攻角的範圍由0度到 +12之間，此時搭配的連接球座大約是固定在伺服機攻角量臂的10.5mm位置（如圖示）。

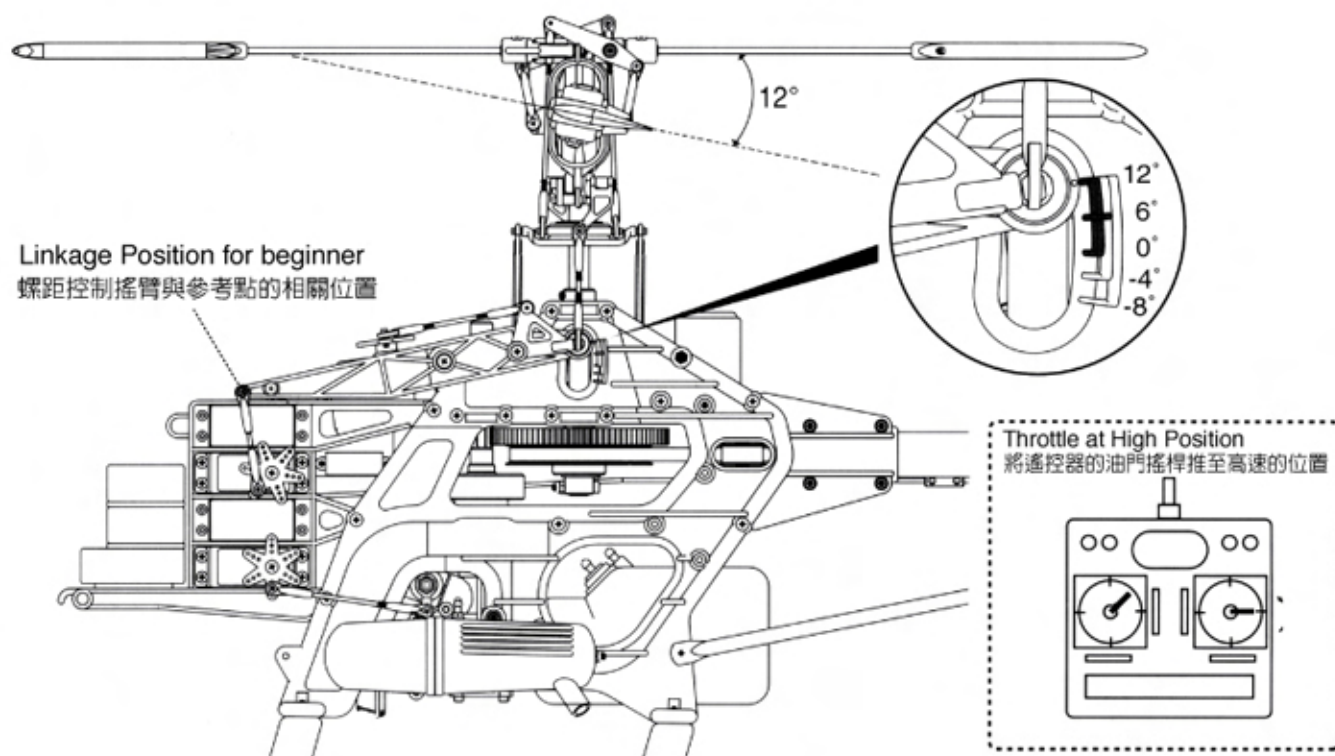
(Hint for beginners) (一般模式的設定)



6° hovering pitch angle is used for beginners, intermediates and experts. The throttle/collective must be in the center position when adjusting the collective pushrod length to make the "point" line up with the 6° hover point on the molded scale(see above diagrams).

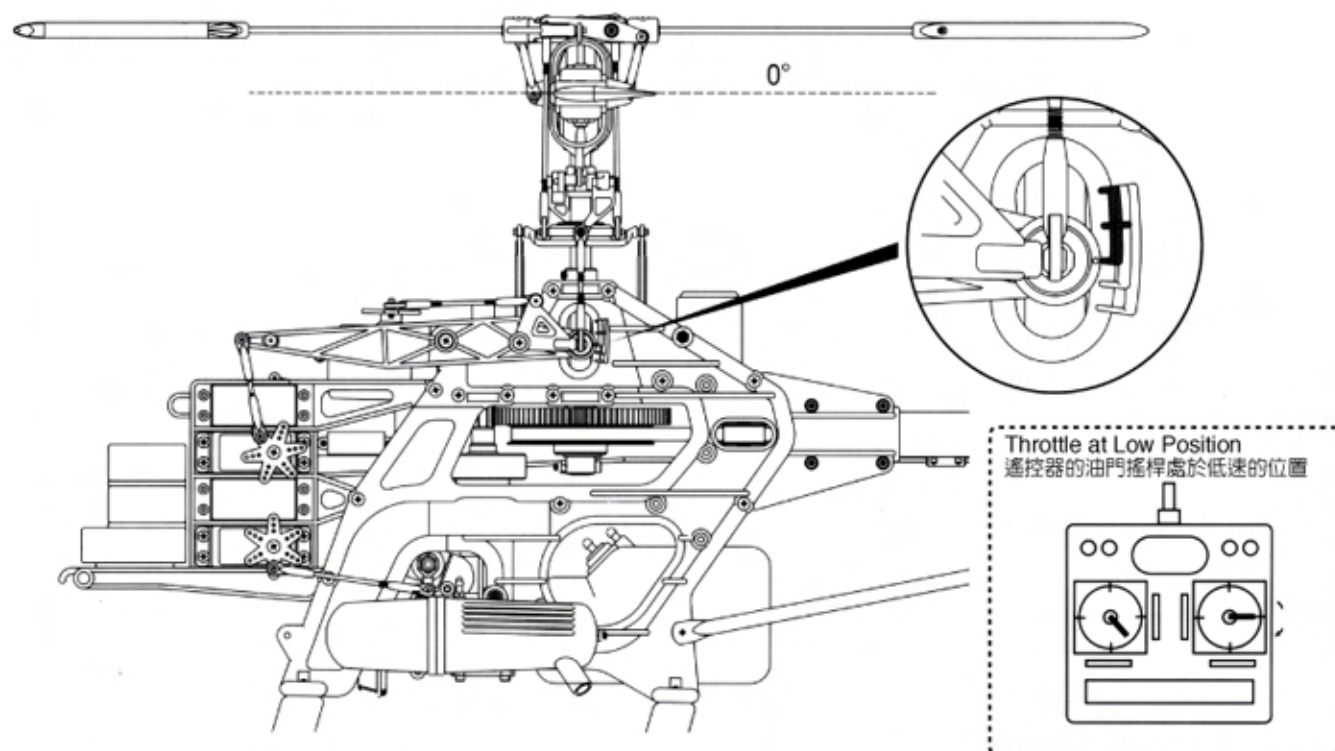
我們建議在一般模式時當螺距位於+6度時、遙控器的油門推桿應該位於中速的位置，而同時必須注意的是此時螺距伺服機舵角控制臂、以及油門伺服機舵角控制臂應該是處於中立的位置（如圖示），並且必須將油門舵角控制搖臂調整到與油門伺服機平行的位置。

■ High End Blade Pitch Setting 油門高速時螺距的相關變化



- Move the throttle/collective stick to the full throttle position(see upper right diagram). The molded "pointer" should now line up with the upper limit mark, which should provide about 12° of blade pitch.
- 當依照前述完成設定時、將遙控器的油門搖桿推至高速的位置，此時主旋翼的攻角應該會是在+12度的位置，使用螺距量規時、請將平衡桿當成零度的參考線。

■ Low End Blade Pitch Setting 油門低速時螺距的相關變化

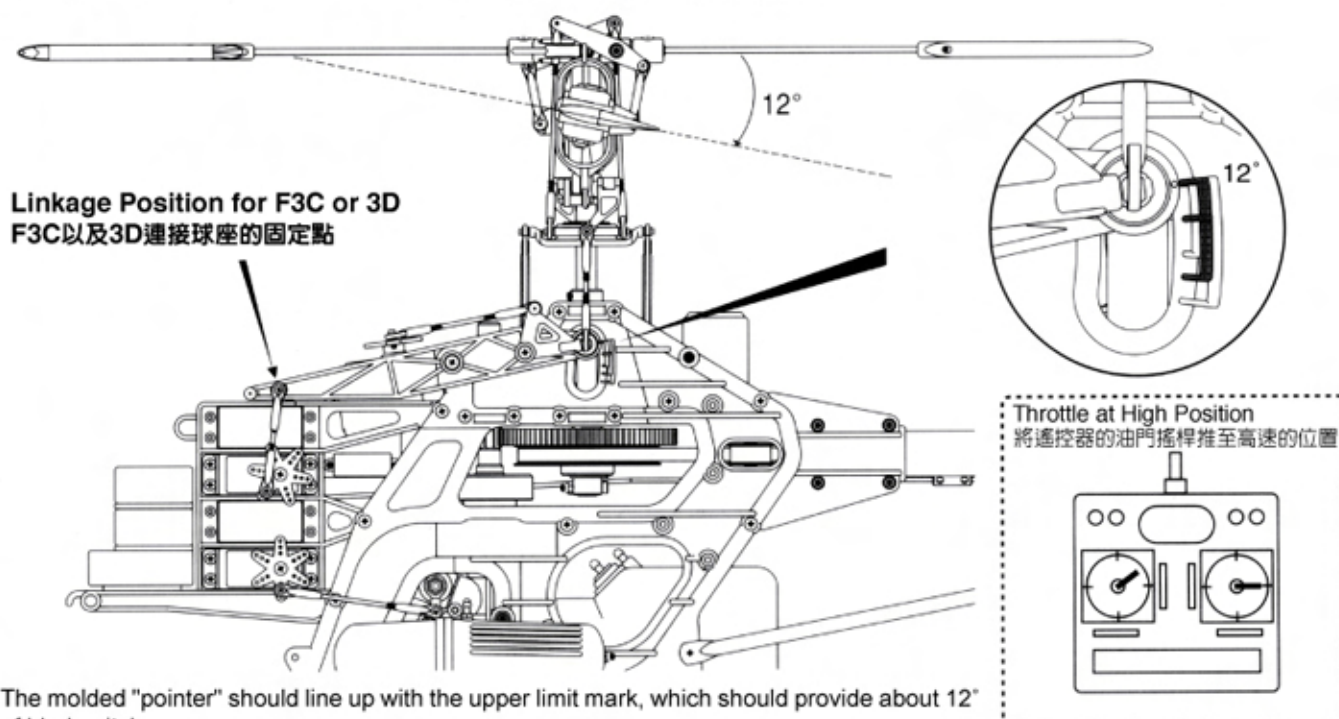


- Move the throttle/collective stick to the low stick position. Use the ATV function of your transmitter to make the "pointer" line up with the 0° mark for beginners(with the -4° mark for intermediates, and -8-degree mark for experts).
- 當遙控器油門搖桿處於低速的位置時、我們建議將它設定為零度，通常此時因為伺服機的原始設定行程關係、它都會超出零度許多，建議您將遙控器的功能開啓至ATV選項至第6CH、縮減低速方向的行程至螺距呈零度（-4度以及-8度的調整程序也相同、依照機身側面的參考點調整）。

Collective Travel for F3C and 3D Flying F3C以及3D的調整建議

- To achieve $+12^\circ$ to -8° of collective travel range, the steel linkage ball must be moved to the inner location as shown in the figure.
- Use ATV function of the transmitter to get the necessary servo travel.
- 在不變更各連接桿的尺寸時、這台直昇機的螺距可設定至 $+12$ 度到 -8 度的範圍。
- 您必須善用遙控器的ATV功能、來達成各個階段螺距的設定工作。

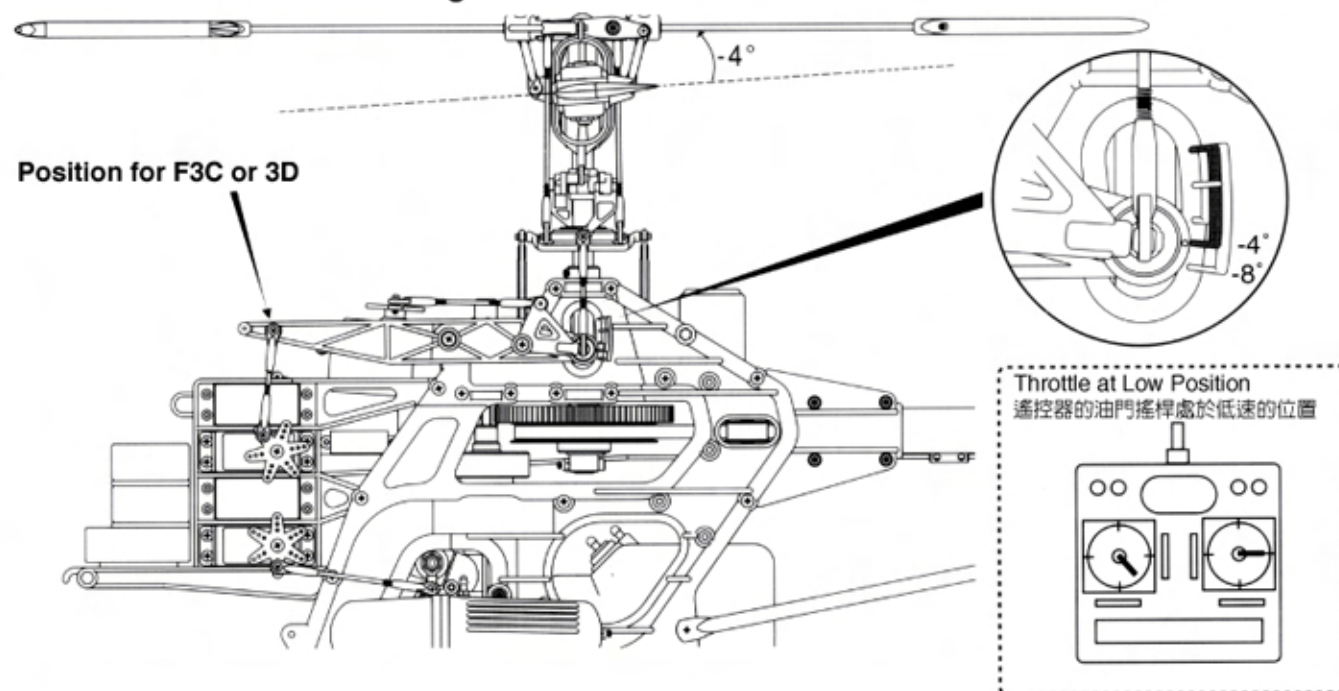
High End Blade Pitch Setting 油門高速時螺距的相關變化



The molded "pointer" should line up with the upper limit mark, which should provide about 12° of blade pitch.

當依照前述完成設定時、將遙控器的油門搖桿推至高速的位置、此時主旋翼的攻角應該會是在 $+12$ 度的位置、使用螺距量規時、請將平衡桿當成零度的參考線。

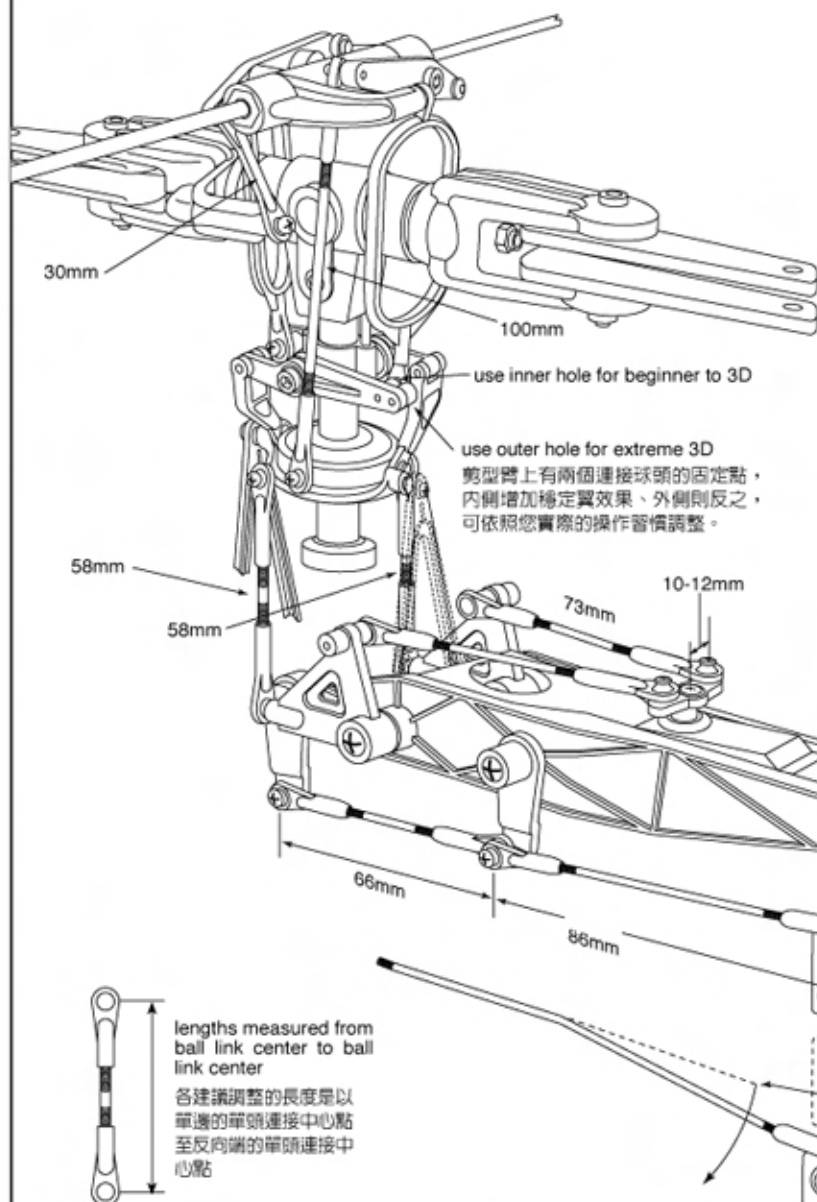
Low End Blade Pitch Setting 油門低速時螺距的相關變化



For intermediates set the low end to -4° . For advanced F3C and 3D flying, set the low end to -8° .

當遙控器油門搖桿處於低速的位置時、若您處於進階階段可將它設定為 -4 度、當因F3C或是3D的需求必須設定至 -8 度時、請參照先前的步驟使用ATV功能調整。

Configuring The Raptor 30 For 3D 翼手龍30 3D飛行設定



5-Point Throttle Curves
5點油門曲線

Normal 正常模式	0	30	50	75	100
Idle-up1 特技模式1	100	85	60	85	100
Idle-up2 特技模式2	100	60	55	80	100

5-Point Pitch Curves
5點螺距曲線

Normal 正常模式	18	38	55	75	94
Idle-up1 特技模式1	0	22	46	70	90
Idle-up2 特技模式2	0	22	46	70	90
Hold 熄火降落	15	38	55	75	100

Blade Pitch Angles (degrees)
螺距角度

Normal 正常模式	-4	6	12
Idle-up1 特技模式1	-9	0	9
Idle-up2 特技模式2	-9	0	9
Hold 熄火降落	-6	5.5	11

collective control for intermediates and 3D +10° ~ -10°

當將連接球座移至內側時可適度的增加操作上的效率符合3D的操作需求 +10至-10度

for beginners

The above pushrod lengths will permit 3D with the Raptor.

Use these lengths as a starting point. Beginners can also use those pushrod lengths, but just connect the collective control to the outside point on the pitch control arm. Pushrod lengths are measured from ball link center to ball link center.

Suggested throttle and collective pitch set up: Idle-up1 is used for continuous 3-D flips and aerobatics. Idle-up2 is used for switchless inverted hover. Use a pitch gauge to check blade angles. It is easier to start setting up idle-up2 blade pitch angles first. Beginners should inhibit idle-up1, idle-up2 and throttle hold. Beginners should only use the Normal mode values. The model should hover at around 1550 rpm in Normal mode, and flies at 1800 in idle-up1.

對3D飛行入門調整的建議

建議您在從事3D飛行訓練時、將木質主旋翼更換為玻璃纖維或碳纖維材質的主旋翼，因為劇烈的3D飛行可能會使木質主旋翼不堪負荷、因而發生危及自身或他人的危險，且剛性較佳的主旋翼對於各項特技動作達成效果有明顯的幫助。

關於各連接桿長度的設定以上提供的是基礎的設定，您更換不同廠牌的主旋翼、或是更改油門控制曲線時、有可能會發生必須再做調整的必要。

而3D飛行設定中的Idle-up1與Idle-up2數據相同、是為了避免飛行當中開關切換的失誤、導致危險飛行情況的發生；您熟悉了各項開關的操作後、您可以將Idle-up1與Idle-up2分別設定為進階以及3D飛行（或依據您的需求設定），以滿足從3D至F3C操作上的需求。通常在Normal模式下轉速的需求、建議值是1450-1550rpm，Idle-up時的最高轉速需求約為1800rpm，切記即使是高級的碳纖維主旋翼還是有轉速上的限制、請參照旋翼的使用說明、切勿超速使用。

Radio and Control Linkage Setup For Raptor 30 翼手龍30遙控器及連桿設定

The performance of any RC helicopter and how well it fly depends strongly on well the model has been set up. We will go through the step-by-step on how to set up the transmitter and mechanics linkages to make your Raptor 30 fly at its best. Before you start, please make up the length of all the pushrods according to the recommended length given in our 3D setup drawing in the instruction manual. The pushrod lengths we have provided are valid for beginners to expert 3-D flying. Then, we recommend using the reset function on your transmitter to reset all settings to factory default values. Check the end point adjustment, or ATV value, on your transmitter to make sure the values are at 100%. Next we recommend program the numerical values we have provided in the table for the five points in the throttle curves and for the collective pitch curves. Now you can proceed to do the mechanical adjustments. We recommend leave the transmitter on during the following adjustments.

在遙控直昇機的領域中有句老話：三分飛行，七分調整。意即一架遙控直昇機好飛與否或性能優劣，取決於調整與設定的恰當與否。為了讓消費者可以更瞭解翼手龍30並進行最佳之設定，本節將一步一步說明機體與遙控器的設定方式，以完全發揮翼手龍50直昇機的飛行性能。在開始設定之前，請按照前述之連桿設定長度，將機體之連桿調整至適當長度。該連桿長度適用於初學者及高階玩家。此外，建議將遙控器所有參數歸零至原廠初始值，並將所有頻道之行程量調整至100%。接下來將油門曲線與螺距曲線調整至本說明書所提供之數值，以作為初始設定。再來便可以進行更細部的設定了。

1. Throttle Adjustment.

The throttle arm on the carburetor should always be parallel to the throttle servo arm. When the throttle barrel is half open, the throttle arm should be straight down. Leave it at this position. Turn on the transmitter and leave the throttle in the Normal Throttle Mode. Set the throttle trim to the bottom and set the throttle stick to the middle. Adjust the throttle pushrod to the correct length. Check the throttle servo travel direction to confirm moving the throttle stick to the high position will move the throttle arm to the full open position. Use a medium length servo arm. Pick a hole on the servo arm so when the throttle stick is moved to the highest or the lowest position, it will fully open or fully close the throttle arm without binding. Now is the time to use the End Point Adjustment or ATV feature on the transmitter to fine tune the throttle servo travel to achieve this. Avoid using too large or too small ATV values. The ATV values should stay between 90 to 100%.

1. 油門調整

在正常模式之下，確認油門伺服機之正逆轉，將油門微調置於熄火位置，選擇適合之油門伺服機擺臂、適當之球頭孔位，並調整油門連桿長度與遙控器之油門ATV值，使其正負值相近且接近100%，並使其在高速與低速的位置下確定化油器全開與全關，如此便完成油門行程之設定。在理想狀況下，引擎化油器之擺臂應該與油門伺服機之擺臂平行，而當化油器開啓於中速狀態，伺服機與化油器擺臂應均是接近垂直的。

2. Collective Pitch Setup

Collective control makes a helicopter ascend or descend by changing the main rotor blade angle. Beginners and advance fliers must attach the collective control pushrod to different locations on the collective control arm. The difference is that advance fliers desire more collective travel range, usually +10 to -10 degrees of blade change range. Beginners only need -2 to +10 degrees of blade change range. We assume you have programmed in our recommended values from the Table for the throttle and pitch curves.

2. 螺距設定

螺距控制意即透過改變主旋翼的角度使直昇機垂直上升或者下降。在攻角控制臂孔位的選擇上，初學者與高階玩家應該使用不同的孔位。原因在於高階玩家須要較大的螺距總行程量，而初學者則否。現在，假設您已按照前述的參數設定油門與螺距曲線。

Collective Setup for Beginners:

Only the Normal Throttle Model will be used. We recommend using a collective pitch range of -4 to +12 degrees. Move the throttle/collective control stick to the center. Attach the servo arm so the servo arm is in a horizontal position. The servo output shaft has spline. Try mounting the servo arm with different orientation until one of the arms becomes as close to horizontal. Attach the steel ball to the collective servo arm at about 15 mm from the center of the servo arm. Move the throttle stick to the middle position. Tilt the collective control arm/tray assembly so it is approximately in the middle of its allowable mechanics tilting range. Use the molded pitch scale on the left side of the plastic frame. The pointer on the collective arm should point to the mark for the hover position. See our drawings of the molded scale in the other section of this manual. Attach the pushrod. The pushrod length should be 51 mm as recommended in the drawing. Use a pitch gauge to check the blade angle, they should be about 5.5 degrees. This is what you need for hovering. This gives a hovering rotor rpm around 1500.

初學者的設定：

我們建議初學者僅使用正常飛行模式，其螺距的行程為-4°~+12°，而停懸時的螺距約為+6°。首先設定伺服機擺臂與螺距拉桿的長度，分別約為15mm與51mm。接著置油門搖桿於中速，將伺服機擺臂安裝於平行的位置，此時的主旋翼攻角應為+6°。將遙控器油門搖桿置於高速，可利用遙控器的ATV功能或者調整螺距曲線，設定高速時的螺距為+12°；同理，將遙控器油門搖桿置於低速，可利用遙控器的ATV功能或者調整螺距曲線，設定低速時的螺距為-4°。注意伺服機的擺動行程量切勿超過機械行程量，以免伺服機燒毀。

如此便完成初始設定，但實際飛行的調整，仍視所使用的主旋翼、引擎狀況、環境及天氣等的不同，而可能需要進一步的調整。這方面我們建議您能夠請當地店家或者是有經驗的飛友協助，以免造成不必要的危險及損失。

Radio and Control Linkage Setup For Raptor 30 翼手龍30遙控器及連桿設定

Move the throttle stick to the high position to check if it causes binding. Move the throttle stick to the low position to check if it causes binding. The blade should be at 10 degrees at full collective control stick setting, and -2 degrees at idle stick position. Use the ATV or End Point Adjustment to eliminate binding, or to make the pitch come out at +10 and -2 at the extremes.

Collective Setup for 3-D:

We recommend using a collective pitch range of approximately -9 to +12 degrees in the Stunt mode, or idle-up mode. Use approximately -6 to +11 degrees in the Throttle Hold Mode. Please see the table of pitch angle values we have provided for 3-D flying. To set up the collective for 3-D or F3C flying, we recommend starting with Idle-up Mode, or Stunt Mode. Increase the ATV or End Point Adjustment of the collective channel to 130%. Attach the steel ball to the collective servo arm at about 15 mm from the center of the servo arm. The pushrod should be around 54 mm long. Move the throttle stick to the center position and mount the servo arm so the arm is in a horizontal position. Move the throttle stick to the high position to check if it causes binding. Move the throttle stick to the low position to check if it causes binding. The blade should be at 12 degrees at full collective control stick setting, and -9 degrees at idle stick position. Use the ATV or End Point Adjustment to eliminate binding, or to make the pitch come out at +12 and -9 at the extremes.

After you have done the above and obtained the +12, 0 and -9 degree collective travel range in idle-up, you will automatically get the proper collective settings for the Normal Throttle Mode and Throttle Hold Mode. This is because you have programmed in the numerical values we have provided in the table.

If the throttle was set up according to described earlier, and the numerical values for the five points from the table have been programmed into the transmitter, you will get the proper U-shaped throttle curve for 3-D flying. We have left the values for idle-up 1 and idle-up 2 the same. Individual fliers can refine the two Idle-up setting to suit the need for different 3-D and F3C maneuvers. With Idle-up on, the main rotor speed should be around 1700 to 1800 for good 3-D flying. We recommend using only carbon graphite main rotor blades for aggressive 3-D flying. Please try the Thunder tiger 600 mm carbon graphite rotor blades, they are designed for extreme 3-D flying with the Raptor 50. Wood main rotor blades are fine for learning how to fly or for practicing simple maneuvers.

3D特技飛行的設定：

有關3D飛行模式的螺距設定，通常須要極大的正負攻角，因此建議使用大約15mm左右的伺服機擺臂以及54mm之控制連桿，並選擇攻角控制臂的內孔，以達到總行程量的需求。在伺服機行程量的調整方面，建議先將螺距曲線的設定歸零至原廠設定值（即0%~100%），然後利用ATV功能調整螺距伺服機之行程量，使其達到攻角控制臂之最大機械行程量，並以不超過其機械行程量為原則，此即為螺距伺服機之ATV調整。接著將遙控器油門搖桿置於高速，利用遙控器的螺距曲線，設定高速時的螺距為+12°；同理，將遙控器油門搖桿置於低速，利用遙控器的螺距曲線，設定低速時的螺距為-9°。確定正負最大螺距值後，使螺距曲線拉為一直線，此即為3D飛行的螺距設定。在熄火降落的螺距設定方面，正螺距約為+11°，負螺距約為-6°~-9°，視個人飛行習慣而有所不同。

至於油門曲線，若是您依照前述的五點設定值進行設定，您會發現遙控器的油門曲線會呈現V或U字型。而油門曲線的細部調整，主要目的在配合主旋翼的攻角，使主旋翼的轉速維持恆定。主旋翼攻角愈大，表示主旋翼負載愈大，須要更大的油門值來對應。若是對於油門曲線的設定沒有經驗，我們建議您能請當地的模型店家或者是有經驗的飛友協助設定，或者使用主旋翼轉速調節器來進行油門的控制，以維持3D飛行時主旋翼轉速的恆定。

3.Cyclic Control Setup

Cyclic controls consist of fore/aft cyclic and left/right cyclic. Fore/aft cyclic is often called elevator control. Left/right cyclic is often called aileron control. Elevator and aileron controls are terms used by airplane pilot. Set the cyclic control stick of your transmitter in the middle and set the trims to the center. Put the swashplate in a level position.

Fore/Aft Cyclic Setup: Attach the elevator servo arm to elevator control servo. The servo arm should point straight up. We recommend attaching the steel ball to the elevator servo arm at about 10 mm from the center of the servo. Adjust the pushrod length from the elevator servo to make the swashplate level.

Left/Right Cyclic Setup: Attach the aileron servo arm to aileron control servo. Mount the servo arm so the servo arm is close to perpendicular to the servo case. We recommend attaching the steel ball to the elevator servo arm at about 10 to 12 mm from the center of the servo. Adjust the pushrod length from the aileron servo to make the swashplate level. The two pushrods from the aileron servo to the aileron bellcrank should be very similar in length.

3.循環螺距的設定：

所謂的循環螺距，即一般所稱的升/降舵控制與副翼控制。升/降舵為機體俯仰軸的控制，副翼則為機體滾轉軸的控制。

首先，將遙控器上的升/降舵與副翼搖桿置中，且所有微調歸零，並使十字盤保持水平。升/降舵伺服機的擺臂，建議長度為10.5mm。

參閱本說明書第22頁的組裝設定，調整升/降舵連桿的長度至86mm，並使伺服機擺臂平行於升/降舵雙推拉搖臂，注意此時十字盤應保持水平。至於副翼伺服機擺臂，建議長度亦為10.5mm，同樣參閱本說明書第22頁，調整拉桿長度至70~73mm，注意此時十字盤應保持水平。

在行程量的調整方面，仍以伺服機行程量不超過機械行程量為原則。將升/降舵與副翼同時打到底，此時攻角控制臂必須能夠順暢地上下運作，若否，則須降低升/降舵與副翼之行程量，使其不產生干涉的情況。

Radio and Control Linkage Setup For Raptor 30 翼手龍30遙控器及連桿設定

4. Tail Rotor Control and Gyro Setup

The radio setup for using a heading hold gyro and a non-heading hold gyro will be different. But the mechanical setup will be the same.

Heading Hold Gyro Setup: Set the tail rotor mixing or revolution mixing values to zero for every throttle mode in the transmitter. Leave the tail rotor control stick in the center and move the tail rotor trim on the transmitter to the center. Attach the servo arm so the arm is straight up. Mount the steel ball 10 to 12 mm from the center of the servo arm. Attach the tail rotor pushrod rod. The pushrod will require a small 15 degree bent to give a smooth run. See the 3-D setup drawing. Adjust the pushrod rod ball links so the tail rotor blade angle is approximately 15 degree. Check the tail rotor control direction so a right tail rotor command should increase the tail rotor blade pitch angle. A left command reduces the angle. Leave the tail rotor control channel ATV at 100%. Use the hand and rotate the gyro to the left should cause the servo to provide a right tail rotor command (increases the tail rotor blade pitch angle). Rotate the gyro to the right should cause the servo to provide a left tail rotor command (reduces the tail rotor blade pitch angle). If the gyro is providing the wrong feedback, then the gyro needs to be mounted upside down or some gyro has a reverse switch on the gyro box. Never use any tail rotor revolution mixing when using a heading hold gyro, that causes the gyro to drift. Never use any tail rotor trim when using a heading hold gyro, that causes the gyro to drift.

Non-Heading Hold Gyro Setup: Leave the throttle stick and tail rotor control stick in the center and move the tail rotor trim on the transmitter to the center. Attach the servo arm so the arm is straight up. Mount the steel ball 10 to 12 mm from the center of the servo arm. Attach the tail rotor pushrod rod. The pushrod will require a small 15 degree bent to give a smooth run. See the 3-D setup drawing. Adjust the pushrod rod ball links so the tail rotor blade angle is approximately 15 degree. Check the tail rotor control direction so a right tail rotor command should increase the tail rotor blade pitch angle. A left command reduces the angle. Leave the tail rotor control channel ATV at 100%. Use the hand and rotate the gyro to the left should cause the servo to provide a right tail rotor command (increases the tail rotor blade pitch angle). Rotate the gyro to the right should cause the servo to provide a left tail rotor command (reduces the tail rotor blade pitch angle). If the gyro is providing the wrong feedback, then the gyro needs to be mounted upside down or some gyro has a reverse switch on the gyro box. Go to the tail rotor revolution mix function in the transmitter. Put in a numerical value of +25 for the high end revolution mixing and -30 for the low end revolution mixing. Move the throttle stick to the high position and you should see the tail rotor servo moves and "increases" the tail rotor blade angle from 15 degrees to about 25 degrees. Move the throttle stick to the low position and you should see the tail rotor servo moves and "decreases" the tail rotor blade angle from 15 degrees to 0 degrees. This is to compensate for the change in torque on the helicopter fuselage when collective pitch is changed. A heading hold gyro does not need tail rotor revolution mixing because it automatically senses heading change and feed in command to lock on the helicopter "heading." A non-heading hold gyro can only stabilizes the "rate" that the helicopters nose is rotating.

For 3-D flying with a non-heading hold gyro, it will be necessary to put in a V-shaped tail rotor mixing curve. Try +15 for the high end revolution mixing and +15 for the low end revolution mixing.

4. 尾舵控制與機頭鎖定式陀螺儀之設定

關於機頭鎖定式的陀螺儀，由於廠牌及種類繁多，因此設定方式多有不同，我們建議您參照所選用的陀螺儀說明書進行設定，以發揮該陀螺儀的最佳性能。以下仍就一般機頭鎖定式陀螺儀的設定原則進行說明：

在開始設定之前，必須先說明的是尾舵行程量的設定與直昇機自旋轉速的設定方式。尾舵行程量指的是尾舵伺服機的行程量，此行程量必須利用陀螺儀本身的設定來控制。而遙控器上尾舵的ATV選項，則控制了直昇機自旋的角速度。但有些較低階的陀螺儀，是無法將這兩個功能分開調整的。

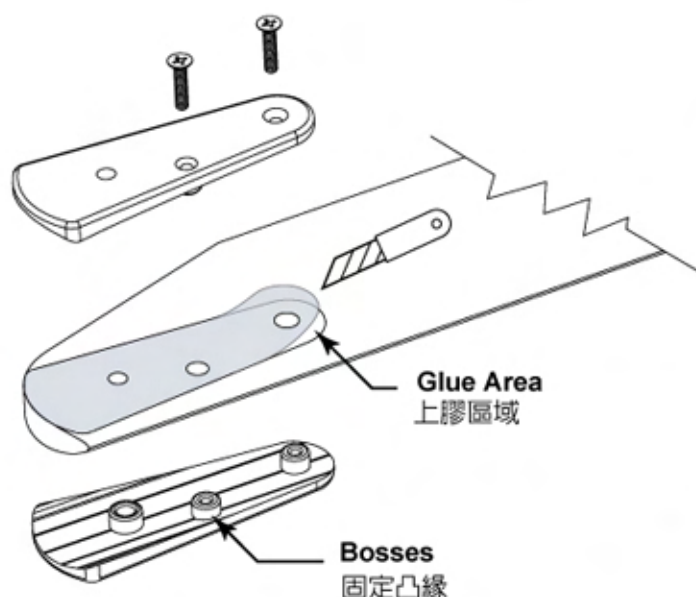
顧名思義，機頭鎖定式陀螺儀的功能即能自動修正尾舵，使機頭指向恆定。意即當我們不打尾舵時，尾舵的控制與修正全都交由陀螺儀來控制。因此設定機頭鎖定式陀螺儀的第一個步驟，即是在所有飛行模式底下，將尾舵微調及副微調歸零，關閉上下跟軸或尾舵自動補償功能，並關閉任何油門（螺距）對尾舵的混控功能。依照陀螺儀說明書選用伺服機擺臂，在尾舵置中的情況下，調整尾舵拉桿，使尾旋翼的角度約為 0° ~ 15° ，並由陀螺儀上調整尾舵左右行程量至最大，但切勿超過機械行程量，以免尾舵伺服機燒毀，如此便完成初始設定。同時進行陀螺儀及尾舵正逆轉的設定：徒手轉動直昇機，使其機頭向右，觀察尾舵伺服機修正方向，應會往尾旋翼方向修正；轉動機頭向左，則伺服機會往機頭方向進行修正。若修正方向相反，請調整陀螺儀上的正逆轉功能，改變修正的方向。其次確認尾舵正逆轉：打右舵時伺服機擺臂應會往機頭方向運作，左舵則反之。若運作方向相反，請使用遙控器上尾舵正逆轉的功能為之。如此便完成陀螺儀與尾舵的初始設定。

在感度的設定方面，則必須在實際飛行中才能夠進行設定。一般來說，感度愈高，則陀螺儀的性能愈能發揮。但當感度高到一個極限值之後，尾舵可能產生極快速的左右修正，並伴隨著高頻的“嗡嗡”聲，此即所謂的尾舵追蹤現象。若是此追蹤現象持續發生，則可能使尾舵伺服機過度工作而減短其壽命。因此，我們建議在飛行中逐漸提高感度值，至追蹤現象產生後，再將感度值降低至可鎖定的範圍，如此便可延長尾舵伺服機的壽命，也不致因追蹤現象而損壞機體結構。

Main Rotor Blades Assembly 主旋翼組裝

For safety concern, be sure to assembly the main blades as following.

安全起見，請確實依下列程序組裝主旋翼：



1. Mark around the blade grips with a felt tip marker.
2. Remove the blade grips and cut the covering gently around 1mm inside of the mark. Be careful not to damage the blades.
3. Sand the inside of the grips lightly for better adhesion. Apply CA or Epoxy to blades in area as shown.
4. Attach blade grips and tighten the screws.
5. Wipe off the excess CA or Epoxy.

1. 將主旋翼連接座與旋翼進行假安裝，並於旋翼包膜上描繪連接座形狀。
2. 移開連接座，以刀片依連接座形狀小心地切除包膜，請注意勿切割到旋翼本體。
3. 可將連接座內側稍以砂紙打磨，以增加黏著力。將去除包膜的旋翼部份平均塗上快乾膠，如下圖所示。
4. 將旋翼連接座合入旋翼本體，並確實鎖好螺絲。
5. 去除多餘滲出的膠水，即完成。

The stock wood blades should be operated with a main rotorspeed of no more than 1700 RPM. For 3D aerobatics or rotor speed more than 1700RPM, it is recommended to use carbon main rotor blades. The above drawing illustrate how to remove the plastic blade grips and then carefully slice away some of the covering material, and add the "thin" type CA glue to further strengthen the wood. After installing the plastic blade grips, apply epoxy around the plastic grip and the wood to seal it off. This adds more strength and prevent oil from seeping through. For beginners, the best rotorspeed is around 1550 RPM. For advanced fliers, a good hovering RPM is around 1550, and a constant 1800RPM in idle-up for 3D aerobatics.

主旋翼安全的使用建議：

木質的主旋翼有材質上的先天限制，使用時有一些必須要謹慎注意的事項：

※木質主旋翼使用轉速的限制：木質主旋翼雖然幾乎都是連貫纖維，但是纖維的抗拉性能並不一致，使用傳統木槳時建議您勿將主旋翼的轉速超出1700rpm的範圍，在經過長期的測試後發現，當木製主旋翼長期以超出1700rpm的速率運作時，內部的纖維容易撕裂發生主旋翼斷裂飛出的情形。

After Flight Checklist 飛行後的檢查項目

- (1) Check every screw and bolt to make sure none has loosened due to vibration.
- (2) Check every rotating and movable part to ensure they still move smoothly and normally.
- (3) Clean off the exhaust residue from the muffler, engine, and helicopter.
- (4) Check all movable parts, such as gears, ball links, belt, etc. for unusual wear.
- (1) 每次飛行後必須詳細的檢查機體的各部位螺絲有無鬆動情形，若發生鬆動必須確實鎖緊再進行下飛行。
- (2) 每次飛行後檢查每一個轉動部位（含單頭連接桿）均能順暢的運作。
- (3) 排氣管、引擎、直昇機本體必須確實的清潔。
- (4) 檢查每一個可動的部件，例如齒輪、球頭連接桿、皮帶...等，是否作動正常。

[1] The engine will not start.

* The engine starting shaft will not turn:

The engine may be flooded with too much fuel. Please remove the glow plug first, then turn the engine with the electric starter until the excess fuel spits out of the glow plug hole.

* The engine turns when the electric starter is applied, but the engine will not start:

- (1) Is the glow plug working? Remove the glow plug and does the platinum coil glow red when a 1.5 volt battery is applied to the plug? If not, then the glow plug battery may be weak and old.
- (2) Is the carburetor needle properly set? Please refer to the engine instruction manual for the proper needle setting.
- (3) Does the throttle control arm move properly and in the correct direction according your transmitter command?

* Engine will start, but quits immediately.

- (1) Use the transmitter to increase the carburetor opening slightly. The throttle stick should never exceed the 1/3 position when starting the engine.

- (2) Try a new or different type of glow plug. There are different types of glow plugs on the market for different types of fuel and operating conditions. Seek the advice of experienced fliers and also experiment with different types of glow plugs until you find the one that suits your operating condition the best.

* Engine runs, but the helicopter will not lift off.

- (1) Check the main rotor blade pitch angle, they should be set at 5.5 to 6 degrees when the transmitter throttle/collective stick is at the center position.
- (2) Does the engine throttle arm move properly? The carburetor opening should be fully open when the transmitter throttle/collective stick is moved up. The carburetor opening should be nearly closed when the transmitter throttle/collective stick is moved down. And the opening should be completely closed when the transmitter throttle/collective stick is moved down and the throttle trim is also moved down.
- (3) Check your engine manual for proper starting point settings. Then try again to start your engine. If smoke is excessive when adding throttle your high speed needle may be too rich. Try a few clicks turning clockwise and try again. Once proper needle settings are achieved, model should lift off effortlessly.

[1] 引擎無法啟動或無法正常起飛時：

當引擎啟動軸無法轉動時：

將您的機身拆下，由前側將火星塞拆下，重複使用啟動器的程序，直到引擎內積存的燃油排出為止，再將火星塞鎖回去，重複啟動的程序。

當引擎可以轉動，但是無法順利啟動時：

1. 檢查電夾是否有足夠的電源，可以將預備的火星塞接到電夾上作確認，若電夾顯示正常，可能需要更換一個新的火星塞。
2. 化油器的油針設定是否需要重新設定？請檢查主副油針的相關設定。
3. 試著將油門微調調高或是將油門控制桿稍微往上推，再進行啟動程序，較低的油門設定可能無法順利啟動引擎。

引擎啟動後馬上熄火的處理：

1. 引擎啟動後，加速的動作稍微減緩，當引擎的低速油針設定的較富油時，可能會發生此狀況。
2. 試著更換多種其他類型的火星塞，依據您所使用的燃油、引擎來選擇最適用的火星塞。

引擎已經啟動，但是無法正常起飛：

1. 檢查主旋翼的攻角，在中速位置主旋翼的攻角應該是在5.5~6度的範圍。
2. 檢查當油門推桿在高速位置時，能夠讓節氣閥達到高速的位置；當低速時，節氣閥必須在接近關閉的位置。
3. 化油器的油針是否位做適當的設定？先順時針旋轉將主油針關閉，再逆時針放開約2~2.5圈（此設定值請參考同好之間的設定或是各廠引擎的說明書建議值），引擎的排煙若是顯得較少，並有咳嗽的聲音發出，此時引擎呈現貧油的現象，必須鬆退油針；當引擎顯得無力，並由消音器中噴出許多燃油時，此時引擎是處於富油的情形，必須適時的鎖進少許油針。

Trouble Shooting 異常處理

[2] Helicopter problems.

* The helicopter shakes.

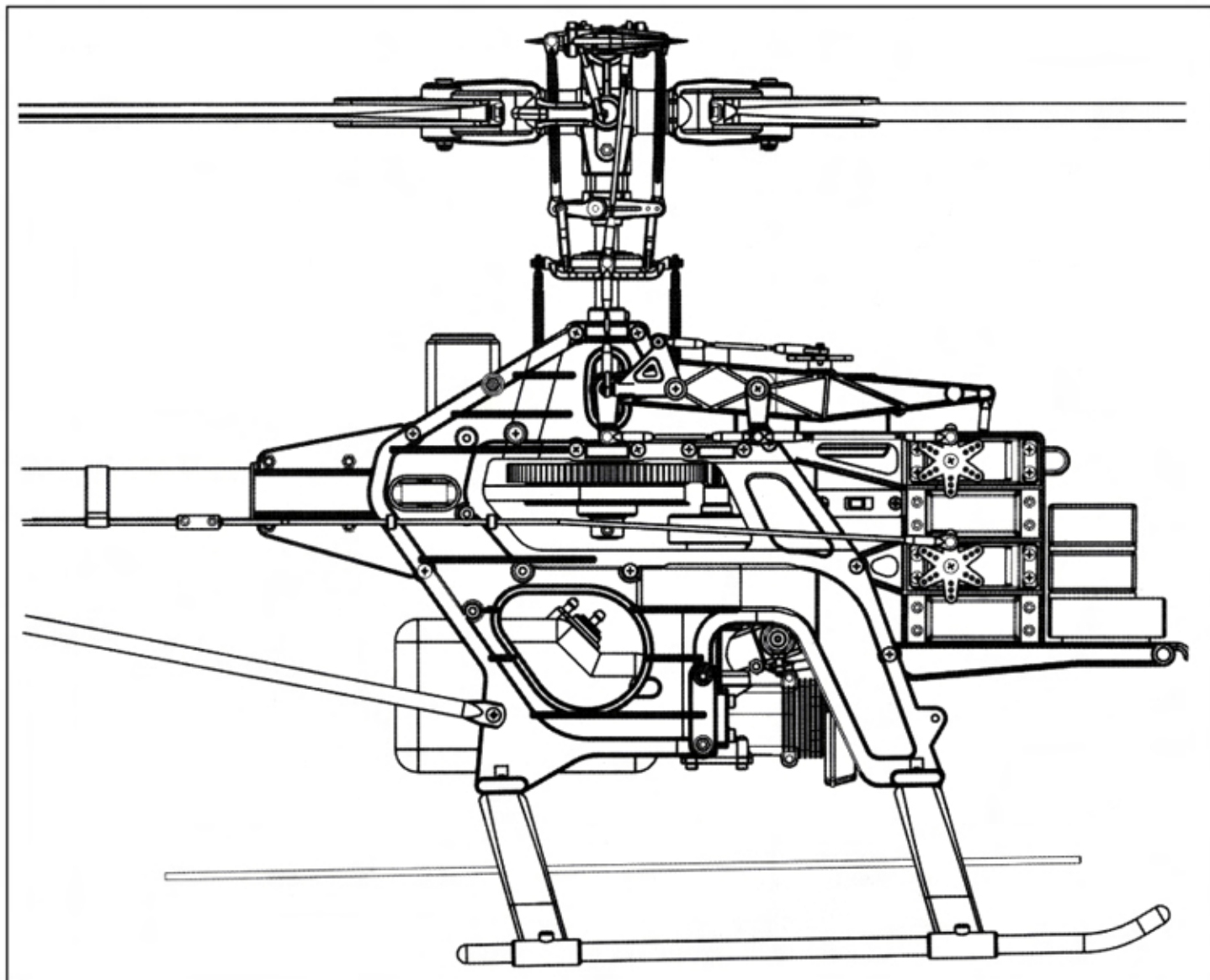
- (1) Is the blade spindle bent?
- (2) Is the flybar bent?
- (3) Is the main rotor shaft bent?
- (4) Are the two control paddles mounted at the same distance from the rotor shaft, and the paddles are parallel to each other, and in the proper direction?
- (5) Is the tail rotor shaft bent? The tail rotor blades mounted properly or damaged?
- (6) Are the main rotor blades damaged or mounted in the proper orientation? The blades may require additional balancing. The blade balance can be checked by removing both blades and then use one of the 4mm blade bolt and nut to hold the two blades together like a teeter totter. Then, hold the blade bolt with your thumb and index finger. The two blades should teeter and remain in a level position. If not, then add some tape to the lighter blade near the blade tip until the two blades teeter in a level position. Hobby shops also sell blade balancers that are designed solely for balancing model helicopter blades.

[2] 直昇機的問題

機體發生明顯的震動時：

- (1) 檢查皮帶是否設定的太鬆或過緊，未正確安裝或發生反纏的現象。
- (2) 檢查平衡桿是否兩端長度不一致或是彎曲。
- (3) 檢查主軸是否彎曲。
- (4) 檢查主旋翼兩端轉座是否跟主軸等距。在組裝旋翼頭時，若未於旋翼緩衝橡皮上油，可能會發生橫軸位置偏移的現象，此時當直昇機低速時會發生明顯的機體震動現象。
- (5) 尾旋翼輪是否彎曲？尾旋翼轉座是否鬆動或損毀？尾旋翼是否有單邊毀損的情形？
- (6) 主旋翼出廠前均已做過嚴謹的配對檢驗工作，但使用時仍必須再次進行主旋翼的重心、重量微調，您可以使用市售的主旋翼重心調整器來作旋翼重心的調校標準。在直昇機套件的貼紙中或主旋翼中均附有寬度約1公分的重心調整用貼紙，當主旋翼裝置在重心調整器上，裁剪適當長度大小的貼紙貼在較輕一端的主旋翼上，將可改善因主旋翼重心、重量不均所產生的震動問題。
- (7) 主旋翼以及尾旋翼的鬆緊度必須一致，若有單一側較緊的情況，也可能造成機體震動。

PARTS LIST SECTION 零件包目錄





PV0486 Flybar Seesaw
穩定桿固定軸



AK0029 Main Shaft
主軸



AK0031 Main Spur Gear
主齒輪組, 85T



AK0032 Tail Drive Pulley
尾驅動輪, 41T



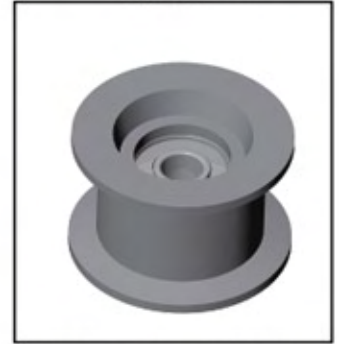
AK0060 Tail Boom
尾管



AK0089 Tail Drive Belt
正時皮帶



AV0038 Cooling Fan Assy.
冷卻風扇組



AV0052 Tail Idler Pulley Assy.
尾惰輪組



NO.9219 Muffler
消音器



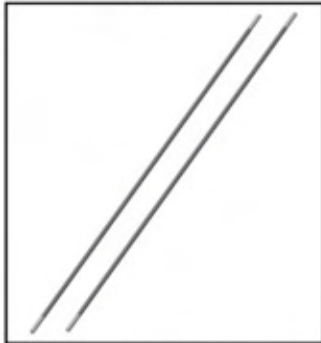
PV0002 Flybar Control Arm
穩定翼轉臂組



PV0004 Mixing Lever
控制搖臂組



PV0005 Flybar Control Rod
穩定翼操控環



PV0008 Flybar Rod
穩定翼固定桿



PV0011 Wash Out Set
控制臂組



PV0012 Pitch Control Arm
攻角控制臂組



PV0013 Elevator Arm
升降舵組



PV0014 Elevator Lever
升降舵控制桿組



PV0015 Aileron Lever
側轉控制桿組



PV0016 Tail Pitch Control Lever
尾旋翼控制桿組



PV0017 Tail Pitch Slider
尾旋翼滑座組



PV0018 Main Shaft Lock Ring
止檔圈



PV0019 One Way Clutch
單向離合器組



PV0020 One Way Clutch Shaft
單向離合器軸



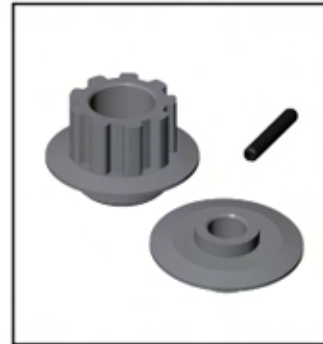
PV0021 Guide Pulley Assy
主惰輪



PV0022 Engine Mount
引擎固定座



PV0027 Tail Case
尾座組



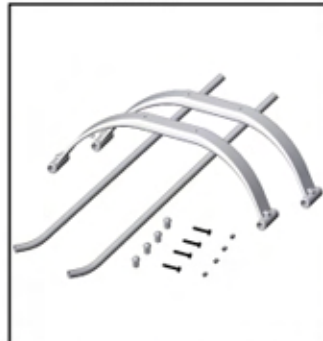
PV0029 Tail Pulley Set
尾輪組



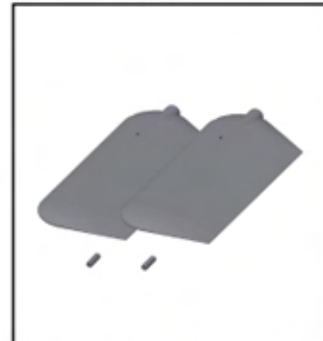
PV0030 Tail Rotor Shaft
尾旋翼軸



PV0033 Servo Frame
伺服機座



PV0035 Landing Skid Set
腳架組



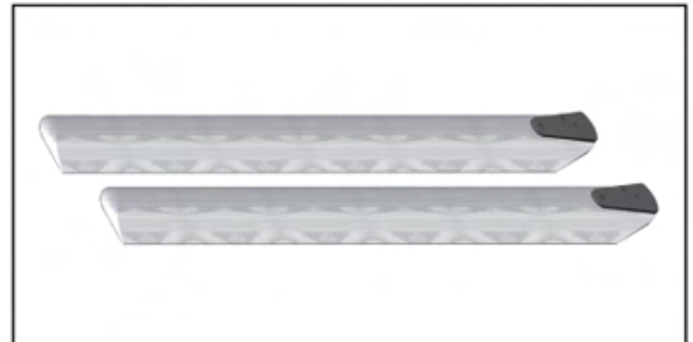
PV0036 Flybar Paddle
穩定翼組



PV0037 Tail Rotor Blade
尾旋翼組



PV0038 Tail Fin
尾安定面組



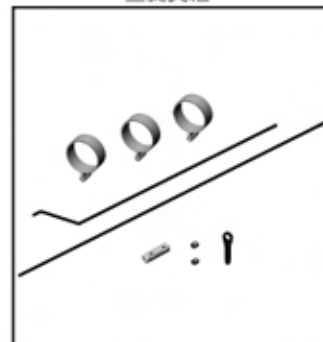
PV0039 Main Rotor Blades
主旋翼組



PV0040 Double Link
雙頭連接桿



PV0041 Ball Link
單頭連接桿



PV0043 Tail Control Rod
尾控制桿組



PV0044 Linkage Rod
連接桿組



PV0048 Pitch Frame/Rotor Hub Seesaw Brg.
攻角/主旋翼座軸承



PV0049 Seesaw Brg.
穩定桿固定軸承



PV0051 Lever Brg.
控制臂軸承



PV0052 Tail Slider Brg.
尾控制滑座軸承



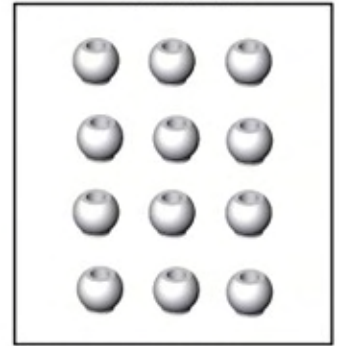
PV0053 Rotor Bolt
主旋翼螺絲組



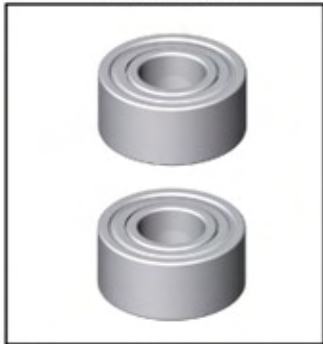
PV0056 Frame Spacer(L)
側板支柱(L)



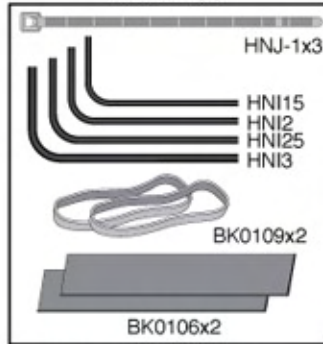
PV0057 Frame Spacer(S)
側板支柱(S)



PV0058 Linkage Ball
連接頭



PV0059 Tail Shaft
尾座軸承/離合器罩軸承



PV0060 Installation Set
組合附件包



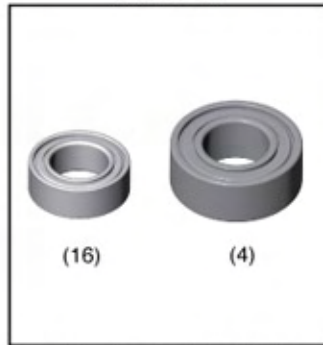
PV0062 Body Mount Rubber Grommets
機身固定墊圈



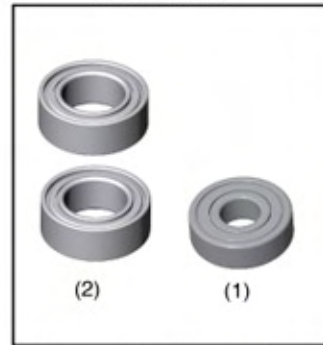
PV0063 Pitch Frame/Rotor Hub Seesaw Bushing
攻角/主旋翼座軸承



PV0064 Lever Bushing
控制臂軸承(普)



PV0091 Bearing Upgrade Kit
軸承組



PV0093 Main Shaft Brg
本體組軸承



PV0148 Tail Rotor Grip
尾旋翼轉座



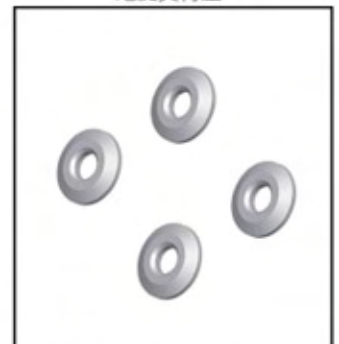
PV0151 Tail Rotor Hub
尾旋翼固定座



PV0639 Tail Rotor Angular Brg
軸承



PV0203 Starter Shaft Brg
啟動軸軸承



PV0209 Washer Bag
墊圈



PV0210 Washer Bag
墊圈



PV0223 Screw Bag, M4X8
螺絲



PV0267 Loctite #242
中粘度螺絲防鬆膠 (藍)



PV0268 Loctite #262
中粘度螺絲防鬆膠 (紅)



PV0269 Grease (For Plastic Gear)
塑膠專用潤滑油脂



PV0270 Grease (For Bearing)
高粘度潤滑油脂



PV0279 TAIL ROD GUIDE
固定環



PV0328 Tail Support
尾管支撐架組



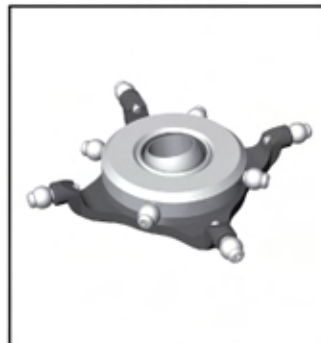
PV0353 Main Rotor Grip
主旋翼轉座



PV0354 Main Rotor Hub
主旋翼固定座組



PV0355 Spindle
固定軸組



PV0357 Swash Plate Assy.
十字盤組



PV0533 Clutch Bell
離合器罩組



PV0359 Clutch
離合器組



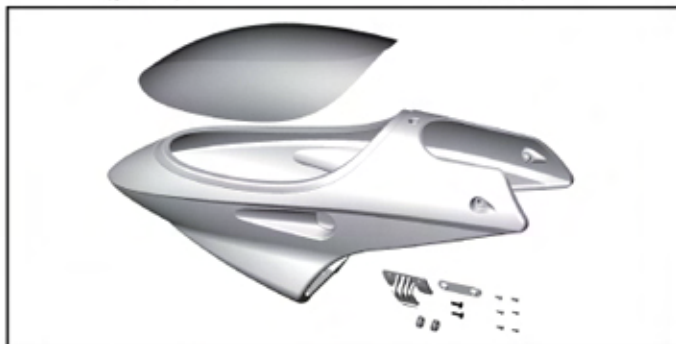
PV0360 Starter Shaft
啟動軸



PV0361 Starter Coupling
啟動接頭



PV0363 Fuel Tank
油箱



PV0364 Canopy Set
機艙罩組



PV0365 Thrust Brg.
止推軸承組



PV0366 Decal
貼紙組



PV0367 Pinion Gear (9T)
驅動齒輪



PV0532 Clutch Liner
來令片



PV0369 Windshield
擋風罩



PV0370 Fuselage Only
機艙罩



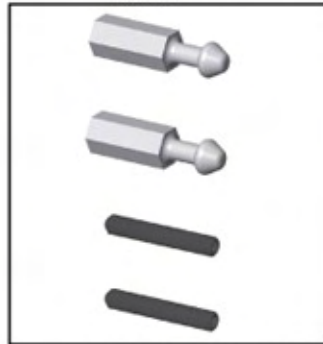
PV0372 Thrust Collar
止推墊片



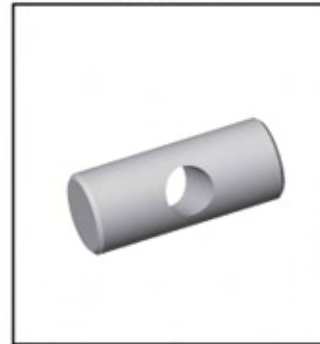
PV0373 Clutch Bell Brg.
離合器罩軸承



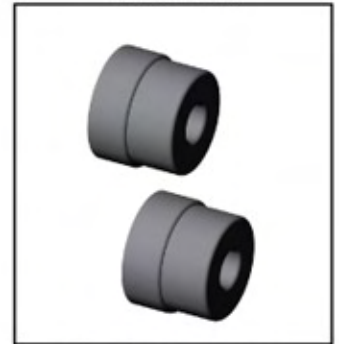
PV0374 Feathering Brg.
啓動軸軸承



PV0375 Body Retaining Set
機殼支柱



PV0376 Main Rotor Pin
主旋翼固定座銷



PV0381 Flap Damper (70)
避震墊圈



PV0454 Skid Pipe End Cap
圓管塞



PV0517 Oneway Clutch Grease
單向軸承油脂

	HMF2-6N	M2X6
	HMF2-8N	M2X8
	HMJ2-10N	M2X10
	HMJ2-14N	M2X14
	HMJ2-6B	M2X6
	HMJ3-22B	M3X22
	HSE2-10B	M2X10
	HSE2612N	M2.6X12
	HSE3-12B	M3X12
	HSE3-18B	M3X18
	HSE3-5B	M3X5

PV0088 Screw Bag (6pcs each)
螺絲



PV0480 Main Frame Set
側板組

	HMC3-10B	M3X10
	HMC3-12B	M3X12
	HMC3-14B	M3X14
	HMC3-20B	M3X20
	HMC3-25B	M3X0.5L25
	HMC3-32B	M3X0.5XL32
	HMC3-8B	M3X8
	BK0616	M3x20
	HME3-10B	M3X10
	HME3-18B	M3X18
	HME3-5B	M4X5

PV0089 Screw Bag (6pcs each)
內六角螺絲組

Parts No. 產品編號	Description 名稱	Item No. 零件料號	Description 名稱	Quantity 數量	Index Page 頁數
AK0029	Main Shaft 主軸	BK0029	Main Shaft 主軸	1	9
AK0031	Main Spur Gear 主齒輪	BK0031	Main Spur Gear 主齒輪	1	7
AK0032	Tail Drive Pulley 尾驅動輪	BK0032	Tail Drive Pulley 尾驅動輪	1	7
AK0060	Tail Boom 尾管	BK0060	Tail Boom 尾管	1	13
AK0089	Tail Drive Belt 正時皮帶	BK0089	Tail Drive Belt 正時皮帶	1	13
AV0038	Cooling Fan Assy. 冷卻風扇組	BV0038	Cooling Fan Assy. 冷卻風扇組	1	10
AV0052	Tail Idel Pulley 尾惰輪組	BV0052	Tail Idel Pulley 小惰輪組	1	13
No.9219	Muffler 消音器組	BN219	Muffler 消音器組	1	10
PV0002	Flybar Arm 穩定翼轉臂組	BK0002	Flybar Control Arm 穩定翼轉臂	2	11
		BK0005	Flybar Arm Bushing 轉臂六角襯套	2	11
		BK0075	Linkage Ball 連接頭	2	11
		HME4-5B	Set Screw, M4x5 無頭內六角螺絲	2	11
		HMJ2-10N	Selftapping Screw, M2x10 自攻螺絲	2	11
PV0004	Mixing Lever 控制搖臂	BK0006	Mixing Lever 控制搖臂	2	11
		BK0075	Linkage Ball 連接頭	4	11
		BK0076	Collar (dxD4xL10) 軸環	2	11
		BK0088	Flat Washer 墊片	2	11
		HMC3-14B	Socket Screw, M3x14 內六角螺絲	2	11
		HMJ2-10N	Selftapping Screw, M2x10 自攻螺絲	4	11
PV0005	Flybar Control Rod 穩定翼操控環	BK0007	Flybar Control Rod 穩定翼操控環	2	11
PV0008	Flybar Rod 穩定翼固定桿	BK0010	Flybar Rod 穩定翼固定桿	2	11
PV0011	Washout Set 控制臂組	BK0014	Washout Base 控制臂座	1	7
		BK0015	Flyber Control Lever 穩定翼控制臂	1	7
		BK0016	Washout Linkage 連接座	2	7
		BK0075	Link Ball 連接頭	2	7
		BK0077	Collar (d3xD4xL6) 軸環	2	7
		BK0079	Pin 固定銷	2	7
		HMC3-10B	Socket Screw, M3x10 內六角螺絲	2	7
		HMJ2-10N	Selftapping Screw, M2x10 自攻螺絲	2	7
PV0012	Pitch Control Arm 攻角控制臂	BK0017	Pitch Control Arm 攻角控制臂	1	8
		BK0075	Link Ball 連接頭	1	8
		BK0078	Collar (d3xD4xL4) 軸環	2	8
		HMJ2-10N	Selftapping Screw, M2x10 自攻螺絲	1	8
		HMJ3-22B	Selftapping Screw, M3x22 自攻螺絲	1	8
		HSE3-12B	Selftapping Screw, M3x12扁平型自攻螺絲	1	8
PV0013	Elevator Arm 升降舵組	BK0018	Elevator Control Arm 升降舵控制臂	1	8
		BK0019	Elevator Arm Parallel Lever 升降舵控制桿	1	8
		BK0020	Elevator Arm Shaft 升降舵固定軸	1	8
		BK0023	Elevator Arm Linkage 升降舵連接座	2	8
		BK0075	Linkage Ball 連接頭	1	8
		BK0084	Pin (D2xL23) 固定銷	2	8
		HMJ2-10N	Selftapping Screw, M2x10 自攻螺絲	1	8
		HSE3-18B	Selftapping Screw, M3x18 扁圓型自攻螺絲	2	8
PV0014	Elevator Lever 升降舵控制桿組	BK0021	Elevator Control Lever 升降舵控制桿	1	8
		BK0075	Linkage Ball 連接頭	2	8
		BK0076	Collar (d3xD4xL10) 軸環	1	8
		BK0088	Flat Washer 墊片	1	8
		HMJ2-14N	Selftapping Screw, M2x14 自攻螺絲	1	8
PV0015	Aileron Lever 側轉控制桿	BK0022	Aileron Control Lever 側轉控制桿	2	8
		BK0075	Linkage Ball 連接頭	4	8
		BK0076	Collar (d3xD4xL10) 軸環	2	8
		HMJ2-10N	Selftapping Screw, M2x10 自攻螺絲	4	8
		HSE3-18B	Selftapping Screw, M3x18 扁圓型自攻螺絲	2	8

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PV0016	Tail Pitch Control Lever 尾旋翼控制桿	BK0024	Tail Pitch Control Lever 尾旋翼控制桿	1	12
		BK0075	Linkage Ball 連接頭	1	12
		BK0076	Collar (d3xD4xL10) 軸環	1	12
		BK0088	Flat Washer 墊片	1	12
		HMJ2-8N	Selftapping Screw, M2x8 圓頭十字螺絲	1	13
		HSE3-18B	Selftapping Screw, M3x18 扁圓形自攻螺絲	1	12
PV0017	Tail Pitch Slider 尾旋翼滑座組	BK0025	Tail Pitch Control Fork 尾旋翼控制座	1	12
		BK0026	Tail Pitch Control Linkage 尾旋翼連接頭	2	12
		BK0027	Tail Pitch Control Slider 尾旋翼控制滑座	1	12
		BK0028	Tail Pitch Control Slide Bushing 尾旋翼控制軸套	1	12
		BK0075	Linkage Ball 連接頭	1	12
		BK0082	Collar, d2xD3xL4 軸環	2	12
		BK0083	Pin, D2xL9 固定銷	2	12
		HMF2-8N	Screw, M2x8 圓頭十字螺絲	1	12
		HSE2-10B	Selftapping Screw, M2x10 扁圓型自攻螺絲	2	12
PV0018	Main Shaft Lock Ring 止檔圈	BK0030	Main Shaft Lock Ring 止檔圈	1	9
		HME4-5B	Set Screw, M4x5 無頭內六角螺絲	2	9
PV0019	One Way Clutch 單向離合器組	BV0033	One Way Clutch Housing Set 單向離合器組	1	7
		HMC3-12	Socket Screw, M3x12 內六角螺絲	4	7
PV0020	One Way Clutch Shaft 單向離合器軸	BK0034	One Way Clutch Shaft 單向離合器軸	1	7
		HMC3-20B	Socket Screw, M3x20 內六角螺絲	1	7/13
		HMM3Z	Lock Nut, M3 止鬆螺帽(鍍鋅)	1	7/13
		HMQ14	Retaining Ring, ø14 軸用C型扣環	2	7
PV0021	Guide Pulley Assy 主惰輪	BV0035	Guide Pulley 主惰輪組	1	6
		BK0036	Pulley Collar 惰輪襯套	2	6
		BK0081	Pin, D13xL18 固定銷	1	6
PV0022	Engine Mount 引擎固定座	BK0037	Engine Mount 引擎固定座	1	10
		BK0087	Flat Washer 墊圈	4	10
		HMC3-14B	Socket Screw, M3x14 內六角螺絲	8	10
PV0027	Tail Case 尾座組	BK0046	Tail Unit Housing (L) 尾座(左)	1	13
		BK0047	Tail Unit Housing (R) 尾座(右)	1	12
		HMC3-20B	Socket Screw, M3x20 內六角螺絲	4	13
		HMC3-25B	Socket Screw, M3x25 內六角螺絲	2	13
		HMM3Z	Lock Nut, M3 止鬆螺帽(鍍鋅)	6	13
PV0029	Tail Pulley Set 尾輪組	BK0050	Tail Pulley Set 尾輪	1	12
		BK0051	Tail Pulley Flange 尾輪緣	1	12
		BK0414	Pin, D2xL12 固定銷	1	12
		HME3-4B	Set Screw, M3x4 無頭內六角螺絲	1	12
PV0030	Tail Rotor Shaft 尾旋翼軸	BK0053	Tail Rotor Shaft 尾旋翼軸	1	12
		BK0414	Pin, D2xL12 固定銷	1	12
		HME3-4B	Set Screw, M3x4 無頭內六角螺絲	1	12
PV0033	Servo Frame 伺服機座	BK0057	Servo Frame 伺服機座	1	6
		HMJ3-12B	Selftapping Screw, M3x12 扁圓型自攻螺絲	6	6
PV0035	Landing Skid Set 腳架組	BK0064	Skid 底座圓管	2	9
		BK0065	Skid Cap 圓管塞	4	9
		BK0066	Skid Brace 支撐架	2	9
		HMJ3-18B	Selftapping Screw, M3x18 扁圓型自攻螺絲	4	9
		HME4-5B	Set Screw, M4x5 無頭內六角螺絲	4	9
PV0036	Flybar Paddle 穩定翼組	BK0067	Flybar Paddle 穩定翼	2	11
		HME3-10B	Set Screw, M3x10 無頭內六角螺絲	2	11
PV0037	Tail Rotor Blade 尾旋翼組	BK0068	Tail Rotor Blade 尾旋翼	2	13
PV0038	Tail Fin 尾安定面組	BK0069	Stabilizer Fin 水平安定面	1	13
		BK0070	Stabilizer Fin Bracket 固定座	1	13

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PV0038	Tail Fin 尾安定面組	BK0071	Vertical Fin 垂直安定面	1	13
		HSE3-12B	Selftapping Screw, M3x12 扁圓型自攻螺絲	2	13
PV0039	Main Rotor Blades 主旋翼組	BV0072	Main Rotor Blades 主旋翼組	2	16
PV0040	Double Link 雙頭連接桿	BV0085	Double Link 雙頭連接桿	2	11
PV0041	Ball Link 單頭連接桿	BK0086	Ball Link 單頭連接桿	12	8
PV0043	Tail Control Rod 尾控制桿組	BK0086	Ball Link 單頭連接桿	2	8
		BK0091	Rod Guide 固定環	3	13
		BK0105	Tail Control Rod Joint 尾控制桿軸環	1	14
		BK100-1	Pulley Pull Rod-1 推拉桿-1	1	14
		BK100-2	Pulley Pull Rod-2 推拉桿-2	1	13
		HME4-5B	Set Screw, M4x5 無頭內六角螺絲	2	14
PV0044	Link Rod 連接桿組	BK0092	Linkage Rod (L=30) 連接桿	3	9/15
		BK0093	Linkage Rod (L=45) 連接桿	3	14
		BK0094	Linkage Rod (L=60) 連接桿	2	14/15
		BK0095	Linkage Rod (L=76) 連接桿	2	12
PV0048	Pitch Frame/Rotor Hub Seesaw Brg. 攻角/主旋翼座軸承	HMV840ZZ	Bearing, d4xD8xW3 軸承	2	8
PV0049	Seesaw Brg. 尾旋翼/穩定翼座軸承	HMV830ZZ	Bearing, d3xD8xW4 軸承	2	11
PV0051	Leaver Brg. 控制臂軸承	HMV740ZZ	Bearing, d4xD7xW2.5 軸承	4	7
PV0052	Tail Slider Brg. 尾控制滑座軸承組	HMV1060	Bearing, d6xD10xW3 軸承	2	12
PV0053	Rotor Bolt. 主旋翼螺絲組	HMC4-27B	Cap Screw, M4x27 內六角螺絲	2	16
		HMM4Z	Lock Nut, M4 止鬆螺帽	2	16
PV0056	Frame Spacer (L) 側板支柱(L)	BK0058	Frame Spacer (L) 側板支柱(L)	5	6
PV0057	Frame Spacer (S) 側板支柱(S)	BK0059	Frame Spacer (S) 側板支柱(S)	10	6
PV0058	Link Ball 連接頭零件包	BK0075	Linkage Ball 連接頭	12	8
PV0059	Tail Shaft 尾旋軸/離合器罩軸承	HMV1150	Bearing, d5xD11xW 軸承	2	12
PV0060	Installation Set 組合附件包	BE1052	Antenna Tube 油門拉桿導管	1	15
		BK0106	Double Side Tape 雙面膠布	2	15
		BK0109	Rubber Band 5x3 20xT1 耐熱橡皮圈	2	15
		HNI15	Hex Wrench 1.5m/m 六角板手	1	—
		HNI2	Hex Wrench 2m/m 六角板手	1	—
		HNI25	Hex Wrench 2.5m/m 六角板手	1	—
		HNI3	Hex Wrench 3m/m 六角板手	1	—
		HNJ-1	Tie Band 2.5x100 固定束帶	3	—
PV0062	Body Mount Rubber Grommet 機身固定墊圈組	BK0102	Body Mount Rubber 機身固定墊圈	5	16
PV0063	Bushing Set 攻角/主旋翼座軸承(普)	BK0108	Bushing (d4xD8xW2.5) 銅襯	2	8/11
PV0064	Lever Bushing 控制臂軸承零件包(普)	BK0107	Bushing (d4xD7xW2.5) 銅襯	4	8/11
PV0088	Screw Bag 圓頭十字螺絲組	HMF2-6N	Screw, M2x6 圓頭十字螺絲	6	—
		HMF2-8N	Screw, M2x8 圓頭十字螺絲	6	—
		HMJ2-10N	Selftapping Screw, M2x10 自攻螺絲	6	—
		HMJ2-14N	Selftapping Screw, M2x14 自攻螺絲	6	—
		HMJ2-6B	Selftapping Screw, M2x6 圓頭十字自攻螺絲	6	—
		HMJ3-22B	Selftapping Screw, M3x22 自攻螺絲	6	—
		HSE2-10B	Selftapping Screw, M2x10 扁圓型自攻螺絲	6	—
		HSE2612N	Selftapping Screw, M2.6x12 扁圓型自攻螺絲	6	—
		HSE3-12B	Selftapping Screw, M3x12 扁圓型自攻螺絲	6	—
		HSE3-18B	Selftapping Screw, M3x18 扁圓型自攻螺絲	6	—
		HSE3-5B	Selftapping Screw, M3x5 扁圓型自攻螺絲	6	—
PV0089	Screw Bag 內六角螺絲組	BK0616	Socket Screw, M3x20 內六角螺絲(半牙)	2	—
		HMC3-10B	Socket Screw, M3x10 內六角螺絲	6	—
		HMC3-12B	Socket Screw, M3x12 內六角螺絲	6	—
		HMC3-14B	Socket Screw, M3x14 內六角螺絲	6	—

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		HMC3-20B	Socket Screw, M3x20 內六角螺絲	4	—
		HMC3-25B	Socket Screw, M3x25 內六角螺絲	6	—
		HMC3-32B	Socket Screw, M3x32 內六角螺絲	6	—
		HMC3-8B	Socket Screw, M3x8 內六角螺絲	6	—
		HME3-10B	Set Screw, M3x10 無頭內六角螺絲	6	—
		HME3-18B	Set Screw, M3x18 無頭內六角螺絲	6	—
		HME4-5B	Set Screw, M4x5 無頭內六角螺絲	6	—
PV0091	Bearing Upgrate Kit 軸承組	HMV740ZZ	Bearing, d4xD7xW2.5 軸承	16	7/8/11/12
		HMV840ZZ	Bearing, d4xD8xW2.5 軸承	4	8/11
PV0093	Main Shaft Bearing 本體組軸承	HMV1680ZZY	Bearing, d8xD16xW5 軸承	1	5
		HMV6800ZZY	Bearing, d10xD19xW5 軸承	2	6
PV0148	Tail Rotor Grip 尾旋翼轉座	BK0302-1	Tail Pitch Housing (A) 尾旋翼座(A)	2	12
		BK0303-1	Tail Pitch Housing (B) 尾旋翼座(B)	2	12
		HMC2610B	Socket Screw, M2.6x10 內六角螺絲	4	12
		HMM26B	Lock Nut, M2.6 止鬆螺帽	4	12
		HMC3-14B	Socket Screw, M3x14 內六角螺絲	2	13
		HMM3Z	Lock Nut, M3 止鬆螺帽	2	12
PV0151	Tail Rotor Hub 尾旋翼座	BK0307	Tail Rotor Hub 尾旋翼固定座	1	12
		HME3-18B	Set Screw, M3x18 無頭內六角螺絲	2	12
		HMM3Z	Lock Nut, M3 止鬆螺帽	2	13
PV0639	Tail Rotor Angular Bag 軸承	HMV1050ZZO	Bearing, d5xD10x4 滾珠軸承	4	12
PV0203	Starter Shaft Brg 啟動軸軸承	HMV696Z	Bearing, d6xD15x5 滾珠軸承(雙遮蓋)	2	—
PV0209	Washer Bag 墊圈	BK0435	Washer, d4xD11x1.7 墊圈	4	11
PV0210	Washer Bag 墊圈	BK0087	Washer, d3xD8x1.4 墊圈	16	—
PV0223	Screw Bag 螺絲	HMC4-8B	Socket Screw 內六角螺絲	20	11
PV0268	Loctite #262 中粘度螺絲防鬆膠(紅)			1	—
PV0269	Thrust Bearing Grease 塑膠專用潤滑油脂			1	—
PV0270	Plastic Gear Grease 高粘度潤滑油脂			1	—
PV0279	Tail Rod Guide 固定環	BK0091	Rod Guide 固定環	3	13
PV0328	Tail Support 尾管支撐架組	BK0447	Tail Support Rod End 尾管支撐架接頭	4	13
		BK0540	Tail Support Rod 尾管支撐架	2	13
		HMJ2-8N	Selftapping Screw, M2x8 自攻螺絲	4	13
		HSE3-12B	Selftapping Screw, M3x12 扁圓型自攻螺絲	4	13
PV0353	Main Rotor Grip 主旋翼轉座	BK0075	Linkage Ball 連接頭	2	11
		BK0596	Main Pitch Housing 主旋翼轉座	2	11
		HMJ2-10N	Selftapping Screw, M2x10 自攻螺絲	2	11
PV0354	Main Rotor Hub 主旋翼固定座組	BK0587	Main Rotor Pin 主旋翼固定座銷	1	11
		BK0616	Socket Screw, M3x20 內六角螺絲	1	11
		BV0595	Main Rotor Hub 固定座組	1	11
		HMM3Z	Lock Nut, M3 止鬆螺帽	1	12
PV0355	Spindle 固定軸組	BK0581	Flap Collar 避震軸環	2	11
		BK0583	Feathering Shaft 固定軸	1	11
		BK0435	Washer, d4xD11x1.7 墊圈	2	11
		HMC4-8B	Socket Screw, M4x8 內六角螺絲	2	11
PV0357	Swash Plate Assy 十字盤組	BV0601	Swash Plate Assy 十字盤組	1	9
PV0533	Clutch Bell 離合器罩	BK0533	Clutch Bell Set 離合器罩組	1	5
		BK0887	Clutch Liner 離合器片	1	5
		HMV1260ZZY	Bearing, d6xD12xW4 軸承	1	5
PV0359	Clutch 離合器組	BK0170	Shim 離合器墊片	1	10
		BV0589	Clutch Bell Set 離合器組	1	10
		HMC3-10B	Socket Screw, M3x10 內六角螺絲	2	10
PV0360	Starter Shaft 啟動軸	BK0592	Starter Shaft 啟動軸	1	6
		HME4-5B	Set Screw, M4x5 無頭內六角螺絲	2	6

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PV0360	Starter Shaft 啓動軸	HMS5	E-Clip E型扣環	1	6
PV0361	Starter Coupling 啓動接頭	BK0594	Starter Coupling 啓動接頭	1	6
		HME4-5B	Set Screw, M4x5 無頭六角螺絲	2	6
PV0363	Fuel Tank 油箱	BV0605	Fuel Tank Set 油箱組	1	5
PV0364	Fuselage Set 機艙罩組	BK0098	Fuselage Clip A 機身夾扣A	1	16
		BK0099	Fuselage Clip B 機身夾扣B	1	16
		BK0102	Robber Groment 機身固定墊圈	2	16
		BK0611	Fuselage 機艙罩	1	16
		BK0612	Windshied 擋風罩	1	16
		HMJ2-6B	Self Tapping Screw 圓頭十字自攻螺絲	6	16
		HSE3-12B	Selftapping Screw, M3x12 扁圓型自攻螺絲	2	16
PV0365	Thrust Brg. 止推軸承組	HMX0612	Thrust Bearing 止推軸承	2	11
PV0366	Decal 貼紙組	JV0093	Decal 機身貼紙	1	16
PV0367	Pinion Gear (9T) 驅動軸	BK0593	Drive Gear 驅動軸	1	5
PV0532	Clutch Liner 來令片	BK0887	Clutch Liner 離合器片	2	5
PV0369	Windshied 擋風罩	BK0612	Windshied 擋風罩	1	16
		HMJ2-6B	Self Tapping Screw 圓頭十字自攻螺絲	6	16
PV0370	Fuselage Only 機艙罩	BK0098	Body Clip A 機身夾扣A	1	16
		BK0099	Body Clip B 機身夾扣B	1	16
		BK0611	Fuselage 機艙罩	1	16
		BK0102	Rubber Groment 機身固定墊圈	2	16
		HSE3-12B	Selftapping Screw, M3x12 扁圓型自攻螺絲	2	16
PV0372	Thrust Collar 止推墊片	BK0584	Thrust Collar 止推墊片	2	11
PV0373	Clutch Bell Brg. 離合器罩軸承	HMV1260Y	Bearing, d6xD12xw4 軸承	2	5
PV0374	Feathering Brg. 啓動軸軸承	HMV1360ZZY	Bearing, d6xD13xw5 軸承	2	11
PV0375	Body Retaining Set 機殼支柱	BK0626	Body Mount Nut 機身固定支柱	2	12
		HME3-18B	Set Screw, M3x18 無頭內六角螺絲	2	12
PV0376	Main Rotor Pin 主旋翼固定座銷	BK0587	Main Rotor Pin 主旋翼固定座銷	1	11
PV0381	Flap Damper (70) 避震墊圈組	BK0586	Flap Damper 避震墊圈	2	11
PV0454	Skid Pipe Cap 圓管塞	BK0065	Skid Pipe Cap 圓管塞	8	8
PV0486	Flybar Seesaw 穩定桿固定軸	BK0004	Seesaw 穩定桿固定軸	1	11
PV0480	Main Frame Set 側板組	BK0058	Frame Spacer (L) 側板支柱(長)	4	3
		BK0059	Frame Spacer (S) 側板支柱(短)	8	8
		BK0599	Main Frame Left Side 左側板	1	3
		BK0600	Main Frame Right Side 右側板	1	3
		HMC3-20B	Socket Screw, M3x20 內六角螺絲	4	15
		HMM3Z	Lock Nut, M3 止鬆螺帽	4	15
		HSE3-12B	Selftapping Screw, M3x12 扁圓形自攻螺絲	24	3

ACCESSORIES 選購配備



No. 3800 Blade Support
主旋翼固定架



No. 3801 6mm Starter Extension
6mm 啟動棒



No. 3802 Precision Pitch Gauge
螺距攻角量規



No. 3803 Remote Glow Adapter
火星塞延長線



No. 8030 Zero α Governor
Zero α 定速器



No. 8070 Heading Lock Gyro, TG7000
TG7000 鎖定向陀螺儀



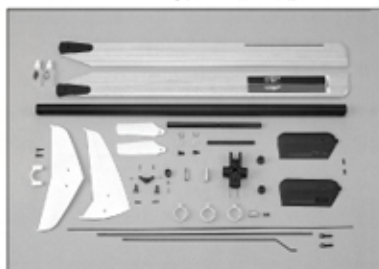
No. 8071 TG7000, DS0606
TG7000 陀螺儀 & DS0606 伺服機



No. 8126 Digital Servo, DS1213
DS1213 數位伺服機
(控制舵面用)



No. 8130 Digital Rudder Servo, DS0606
DS0606 數位伺服機(尾舵用)



NO.3831 Raptor 30 V2 Crash Kit
30級翼手龍維修套件

OPTIONAL PARTS 升級零件



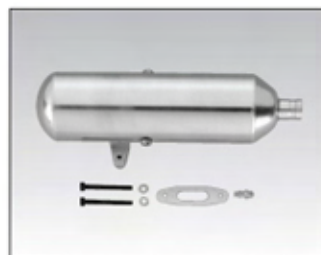
PV0054 Servo Mounting Plate
伺服機固定片



PV0092 Swashplate
十字盤組



PV0099 Carbon Tail Boom
碳纖維尾管



PV0102 High Performance Muffler (.36/.39)
消音器



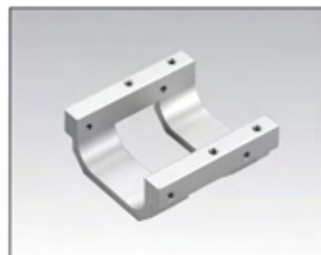
PV0103 Carbon Tail Boom Brace
尾支撐架組



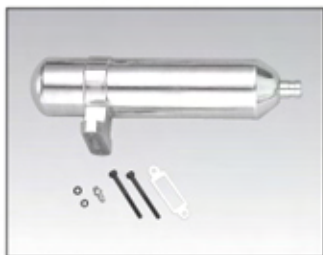
PV0104 Aluminum Frame Post
側板支柱組



PV0105 Cooling Fan (.36) 冷卻風扇
PV0106 Cooling Fan (.50) 冷卻風扇



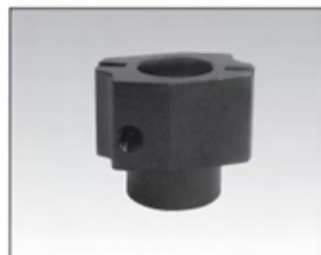
PV0107 Engine Mount (.50)
引擎固定座



PV0109 High Performance Muffler (.46~.50)
消音器組



PV0108 R50 Tail Boom
50級尾管組



PV0114 Metal Washout Base
金屬控制臂座

OPTIONAL PARTS 升級零件



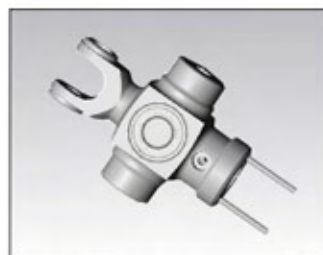
PV0311 Header Tank
副油箱



PV0321 Rear Mounted Tail Servo Tray
後置伺服機座



PV0326 Carbon Graphite Base Plate
碳纖維底座補強板



PV0338 Metal Main Rotor Hub For V2
金屬主旋翼固定座



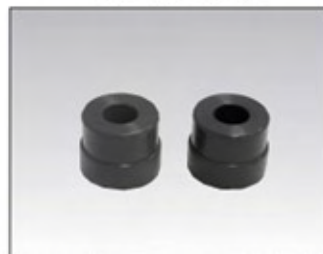
PV0339 Metal Main Rotor Grip For V2
金屬主旋翼轉座



PV0349 Push/pull Elevator Lever Set
升降舵雙推拉桿組



PV0345 R30 Rear Servo Rod 後置伺服機拉桿
PV0346 R50 Rear Servo Rod 後置伺服機拉桿



PV0356 60° Flap Damper 60度避震器墊圈
PV0382 80° Flap Damper 80度避震器墊圈



PV0379 Auto-R Tail Pully
自動旋轉尾驅動輪



PV0380 Pinion Gear 10T
驅動齒輪



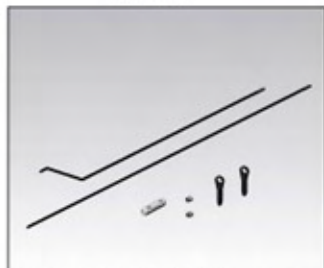
PV0384 Wire Clamp
電線整理座



PV0387 Throttle Lever
油門搖柄



PV0390 R50 Carbon Tail Boom
尾管



PV0392 R50 Tail Control Rod
尾舵控制拉桿



PV0394 Carbon Fiber-look Windshield
仿碳纖維擋風罩



PV0399 Main Rotor Grip Post
金屬旋翼搖臂支柱



PV0439 METAL TAIL PITCH SLIDER
PV0439-L METAL TAIL PITCH SLIDER (BL)
金屬尾旋翼控制座



PV0440 METAL FRAME SPACER(S)
金屬側板支柱



PV0441 METAL ELEVATOR LEVER SET
金屬升降舵控制組



PV0442 METAL MIXING LEVER SET
金屬混控臂組



PV0443 Stabilizer Control Set
金屬穩定翼控制組



PV0444 Flybar Control Arm Set
金屬穩定翼控制臂組



PV0445 Metal Washout Assembly
金屬剪型臂控制組



PV0446 Metal Aileron Lever Set
金屬側轉控制臂組

OPTIONAL PARTS 升級零件



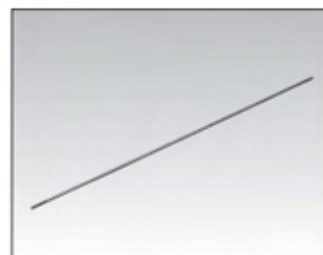
PV0447 Elevator Arm Link
升降舵連接座



PV0448 Socket Link Ball Screw
內六角連接頭螺絲



PV0449 Rotor Grip Plate Set
金屬主旋翼搖臂組



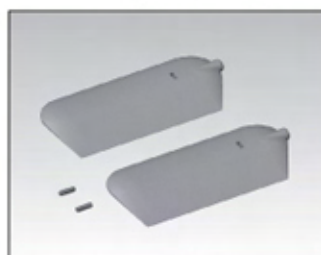
PV0450 SUS Flybar Rod
SUS 平衡桿



PV0451 Hardened Main Shaft
強化主軸



PV0481 Light Flybar Paddle
輕量穩定翼(白)



PV0482 Ultra Light Paddle
超輕量穩定翼(紅)



PV0483 Carbon Tail Fin Set
碳纖維安定面組



PV0484 Metal Button Rotor Hub
金屬主旋翼固定座



PV0485 R50 SE Decal
R50 SE 貼紙



PV0499 SUS Tail Hub
SUS 尾旋翼固定座